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ABSTRACT

This document consists of four papers that provide a handbook on ethics/values education and its place in STS (Science, Technology and Society). The handbook addresses basic issues in ethical theory, the place of ethics and values in the STS curriculum format, the conduct of ethics and values discussions in the classroom, and the appropriate relations between the school district and the local community on values-related activities in STS instruction. "The Responsibility Cycle" (Leonard J. Waks) develops an STS curriculum format based on the definition of the STS education prepared by the Science, Technology and Society Project. "Ethical Concepts and Theories for STS" (Deborah G. Johnson) surveys the most important ethical theories and demonstrates their application to STS issues. "School-Community Relations for Ethics and Values in STS Education" (Leonard J. Waks) presents 10 guidelines for schools to follow in building community acceptance and support for values-related activities in STS education. "Using Discussion to Explore Values and Develop Positions on STS Issues" (James S. Leming) presents a method for selecting STS issues for instruction, preparing for classroom discussion of these issues, managing the discussion, and evaluating the discussion as an instructional activity. (DB)

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Working Papers in
*Science, Technology, Society*

**NATIONAL STS NETWORK**

# S T S

A Support Network for the Implementation
of Science, Technology and Society Education
in Junior and Senior High Schools

Working Paper 1

## THE RESPONSIBILITY CYCLE

Leonard J. Waks
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# THE RESPONSIBILITY CYCLE

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## INTRODUCTION

Science, Technology and Society (STS) is an educational innovation designed to promote responsible citizenship in our technologically dominated era. Today's citizens are faced with personal and social value and life-style choices and public policy issues which are beyond the scope of traditional values and moral systems. Examples include life-extension, genetic screening, the strategic defense in space, release of genetically engineered organisms into the environment. Today's responsible citizens must understand these innovations and discoveries and their impacts on society. At present this understanding is not widely distributed among citizens, and this threatens the quality of our lives, our natural environment and future generations, and even our democratic institutions (Prewitt, 1983).

In 1985 a national taskforce, composed of K-12 teacher leaders in science, technology, social studies and English education, and college teachers representing several disciplines, met at Penn State under the auspices of the Science through Science, Technology and Society (S-STS) Project to set forth a clear definition of Science, Technology and Society (STS) education. The taskforce established seven criteria as essential to STS lessons, units, and curriculum materials:

1. **Responsibility.** The material develops learners' understanding of themselves as interdependent members of society and society as a responsible agent within the ecosystem of nature.

2. **Mutual Influences of Science, Technology and Society.** The mutual influences of "Technology," "Science" and "Society" on each other are clearly presented.

3. **Relation to Social Issues.** The relations of technological or scientific developments to societally relevant issues are made clearly, early, and in compelling ways to capture attention.

4. **Balance of Viewpoints.** The material presents a balance of differing viewpoints about the issues and options without necessarily striving to hide the teacher's or author's perspective.

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5. **Decision Making and Problem Solving.** The material engages students in developing problem-solving and decision-making skills.

6. **Responsible Action.** The material encourages learners to become involved in a societal or personal course of action after weighing the trade-offs among values and effects drawn from various scenarios or alternative options.

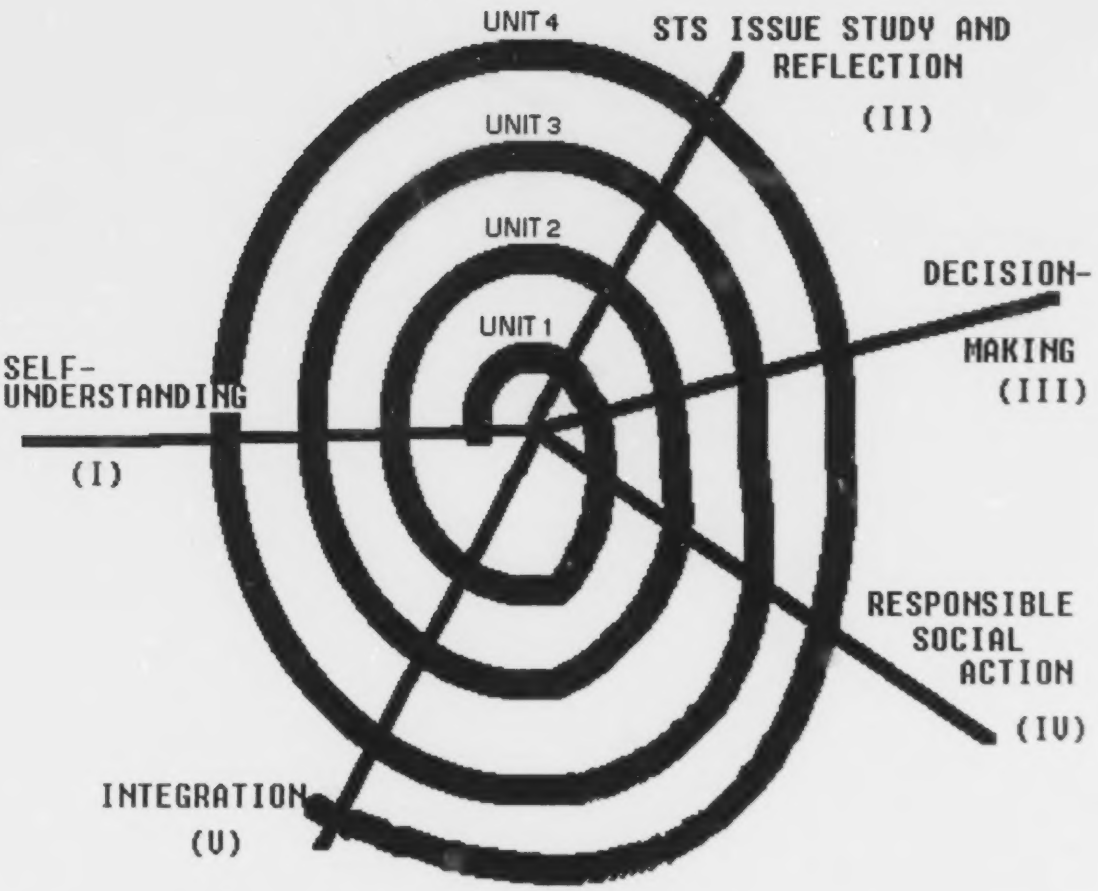
7. **Integration of a Point of View .** The material helps learners to venture beyond the specific subject matter to broader considerations of science, technology, and society, which include a treatment of personal and societal values/ethics.

To qualify as a "science through STS" lesson or unit, one further criterion was stated:

8. **Science Confidence.** The material uses this STS linkage to foster learners' confidence in handling and understanding at least one (limited) science area, and/or handling and using some quantification as a basis for judgments in the STS area. STS education, defined by these criteria, is committed without apology to promoting democratic values and the wide distribution of necessary knowledge, skills for full participation in the democratic processes of social regulation.

In this chapter the "responsibility cycle" is presented as an organizing framework, based securely upon the eight criteria of the S-STS Taskforce, for teaching and learning about ethics and values issues which inevitably arise in STS education. This cycle is set forth as an heuristic to help educators identify, select, organize and sequence learning experiences and activities. By moving through the phases of the cycle, learners of all ages can be guided in forming their convictions and commitments, their life-style choices and values, as these bear upon the technology dominated issues facing our society. As they move through this cycle again and again, on issue after issue, confronting and thinking through science and technology dominated issues of increasing complexity, learners can make progress toward mature social responsibility.

The cycle is divided into five "phases," labeled (i) self-understanding, (ii) study and reflection, (iii) decision-making, (iv) responsible action, and (v) integration. While the characteristic learning activities in each phase change as the learner grows in maturity, and even the meanings of such terms as "decision making" and "action" evolve, the five phase cycle remains a useful organizing tool at all educational levels from childhood to adult and continuing education.




**PHASES OF THE RESPONSIBILITY CYCLE**

Purposes of the Responsibility Cycle Framework

The responsibility cycle is set forth here as a practical tool, an heuristic, to assist teachers and supervisors in identifying, selecting, and sequencing learning activities related to STS issues and especially their ethical and value dimensions. It is neither a theory nor fully elaborated conception of STS education. Rather, it is an organizing framework, an outline which must be filled in as STS lessons, units, materials and instructional strategies are chosen or

developed. As an organizing framework, it steers away from strong prescriptions about specific instructional methods or curriculum choices. It takes no sides on outstanding theoretical or research issues. Rather, it provides a common sense approach for utilizing the insights, resources, theories and methods available in and appropriate to various settings, for pursuing STS goals.

As a practical tool the cycle must be teacher-friendly, compatible with the skills and expectations of teachers. It must be flexible enough to permit variation in content and instructional method to meet available staff resources, strengths, and enthusiasms. Like a true friend, it must support actual teachers in doing what they can do and choose to do -- what is workable in their institutional and community contexts.

To be useful such a framework must be compatible with many approaches to ethical theory, values education and the curriculum development process, and flexible enough to accommodate and make practical use of new theory and research as they become available. The framework can help teachers locate where theories and research can be brought into play. The cycle concept is in harmony with the goals and methods of available STS curricula (e.g. the "Innovations" course published by BSCS.) It takes account of current thinking regarding ethics and values education and STS instructional organization (Ryan, 1986, Fullinwider, 1988, Social Science Education Consortium, 1987; Rubba, 1987). The responsibility cycle offers a starting point from which educators and materials developers can make creative contributions to STS education, consistent with their personal styles and institutional requirements.

The cycle will be further explained in section II, and its application will be considered in section III. First, some of the basic concepts of ethics and values in STS must be considered.

## I. THE ETHICS AND VALUES DIMENSION

STS educators speak of the need for education to promote an ethic of social responsibility in our technological era. Just what is social responsibility, and what does it demand of today's citizens?

### Responsibility

From the beginning of the STS movement, ethical and values concerns, and particularly the notion of responsibility, have played an important role. As the philosopher Hans Jonas has noted, contemporary technology has irreversibly altered the nature of human action with the magnitude and novelty of its works and their impact on humanity's global future. In the new situation our inherited ethical and value ideas, geared to the

direct, face-to-face dealings of one person and another within narrow limits of space, time, and power, are no longer adequate. This leaves us unprepared to think through our contemporary problems and options, and form convictions and make commitments appropriate for our time. Jonas asserts that "the lengthened reach of our deeds moves responsibility, with nothing less than man's fate for its object, into the center of the ethical stage."

Our first associations with the elusive idea of responsibility may be with obligation and accountability, with making demands and expecting compliance -- "students are responsible for silence in the halls!" People live in social systems and are bound by rules, are answerable if they fail to live up to them. Our responsibilities, in this first sense, are what society demands of us. Students are responsible for attending class, teachers for covering the topics in the textbook, drivers for observing the rules of the road, etc. When people speak of responsibility as a "fourth R," equal in importance to reading, writing, and arithmetic, this is most likely what they have in mind. "Just say no!" -- to drugs, sex, cheating, playing hooky. Rules are rules, and the responsible student does what he or she is told. Responsibility in this sense is akin to docility -- which at root means teachability, after all.

But even hide-bound conservatives will grant that there is more to responsibility than this! A second important sense is related to awareness. The responsible driver doesn't merely follow the rules of the road, but sharpens his senses and stays alert for any possible unexpected dangers. Acting responsibly as a close friend means going beyond the obvious obligations such as keeping explicit promises, and becoming aware of possible implicit expectations which require sensitive communication.

A person becomes responsible not merely by according with rules, or even by expanding awareness, but also by consciously accepting responsibility, growing into it, taking it on, shouldering it. Responsibility consists as much in choosing and shaping rules of conduct as in following them. We can get some intuition about this by considering the term "responsible agent" in ethical theory. An "agent" is one who is in charge of his conduct, a creative cause (as contrasted with a patient, one who is acted upon, an effect).

The elements of choice, acceptance, and commitment implicit in responsibility, connect it to two of the most fundamental aspects of our humanness: caring and personal creativity. As Herbert Fingarette notes, a person takes on responsibility, becomes a responsible agent, when he accepts as a matter of personal concern, something that matters to him and he cares about, something which society has offered -- and the

consummation of responsibility may include the creative transformation, in large ways or small, of what is offered, e.g. when "We are the World" is offered in response to the problem of hunger.

This makes responsibility central to being a person. The growth of responsibility is a crucial, and perfectly natural, though by no means inevitable, feature of growing into personhood. How do adults assist in this process? As we begin to judge the child ripe for accepting responsibility, we begin to hold him accountable, and "it is in the nature of the human being that, if we have chosen our moment well, he usually responds to this treatment by actually accepting responsibility (Fingarette, p. 33)." But when this fails, we recognize that the child has not yet accepted responsibility, so we back off from holding him accountable.

> The child eventually becomes a responsible person by being treated more and more like one. But when he fails, we excuse him by saying "he is only a child." (But) the more the child demonstrates a persistent, intelligent, and reasonably wide-ranging effectiveness and purposefulness in some area of his conduct, the more we are inclined to minimize the qualification of our treatment of him as a responsible person. When at last he comes to act consistently like a responsible person, then he <u>is</u> one, and only then.

This implies that only when responsibility is freely accepted can the connection to obligation be made to stick. We can make demands of, and express our moral indignation about, those who refuse to accept responsibility. But our demands are futile if addressed to those who have not already invested themselves, for otherwise there are no pegs within them upon which to hang these demands. The failure of others to care, to make their intelligence and personal creativity available, to invest themselves and become "part of the solution," simply leaves them out of the circle of those to whom such demands and obligations meaningfully apply. When they are children no longer, we call those who continue to reject responsibility "socio-paths." We stop speaking in terms of obligations, making demands, or expecting anything good to come from them. Instead, we learn to get out of their way and if necessary, to lock them up.

The important insight here is that responsibility is not a mere burden, but a natural, potentially joyful, and even essential feature of the active adult life. Responsibility is not merely one of the "costs" of adult life, but also one of its chief "benefits, even if it is something of an acquired taste.

Education for responsibility requires that as young people mature, they must be confronted with significant challenges. As learners "ripen," the demands must be stepped up, and nurturing

support in the form of instruction, coaching, and encouraging praise is provided. However, if the young start off alienated, or are confronted with meaningless demands or demeaning tasks instead of real challenges, or are denied necessary support and encouragement, responsibility is not likely to blossom, and both the young people and the society-at-large are certain to be losers.

Responsibility for the Highest Good

Aristotle tells us (Politics, Book I) that every community is "established with a view to some good, for mankind always act in order to obtain that which they think good, but the political community which is the highest of all, and which embraces the rest, aims at ...the highest good (1127)," the happiness of the members in a just and virtuous society. The citizen is an office holder in the political community, who by voting, serving on juries, participating in public discussions and public affairs, influencing the legislative and administrative activities, alone or through membership in organizations, contributes to the community's "aiming at the highest good."

STS education situates the learner as a responsible agent, a "young citizen," in a society increasingly dominated by the impacts of science and technology. Responsible citizens take responsibility for the impacts of science and technology on society. That is, they increasingly become aware of how science and technology make positive or negative differences in people's lives, and through their thinking and acting attempt to promote the positive and prevent the negative differences.

When we speak of the impact of science and technology on society, we may be referring to two kinds of effects, (1) effects on the normative structure of social life, and (2) direct positive or negative differences in the value, the quality of lives. These ideas demands further clarification.

Effects on Normative Structure. When we speak of "society" we may be referring merely to a collection of people. But more frequently we are referring to the structure of norms within which their behavior is organized, a structure which continues to exist though some people die and others are born. This structure involves institutions (marriage and family, law and government, knowledge and education, music and the arts, business and industry, technology and invention, morality and religion, etc.). Institutions are systems of norms which regulate and establish patterns regarding important behaviors --- those through which people meet their needs, express their values, and achieve their goals and aspirations. When our institutions are strong, we know what is expected of us (our "roles") and others, and at least we can form stable expectations and establish our life plans. When important norms weaken, (e.g. rules of sexual behavior) we may

for a while be unable to know what to demand from ourselves and others. Norm weakness makes many people unsettled and prompts some of them to cling to older norms and patterns. On the other hand, periods of normative change do give members of society freedom to try doing things in new ways.

Changing science and technology challenge and erode social norms, as, for example, the birth control pill affected norms of sexual conduct. At their best, norms are adaptive tools which serve to secure basic needs and establish a framework for forming and pursuing plans, values goals and aspirations. Rapid and uncontrolled normative change can thus disturb the lives of people in society in fundamental ways, opening up new possibilities but also destroying possibilities which many found useful and even necessary as guideposts for living.

Effects on Value. Few terms have been used with as little clarity as the terms "value" and "values," so it is important to gain some clarity about this family of basic ideas.

(a) For present purposes we can follow the usage of Kurt Baier and define the value of something as its capacity to confer a benefit on someone, to make a favorable difference in his or her life (Baier, 1969). We may further distinguish the inherent value of something as the value it possesses in itself, and the instrumental value it possesses as it brings into or maintains in being something else which confers a benefit directly. Thus a a Mozart symphony may engage our attention and promote deep pleasure. In itself it adds to our life, so we say that the music has inherent value. On the other hand, our stereo system reproduces the sound faithfully, and so we judge it to be a good instrument, to have instrumental value -- it is an essential part of the cause of an inherently valuable musical experience.

(b) We also speak of people as valuing things and other people. This idea of "valuing something has two important senses (1) prizing, appreciating, enjoying, and (2) judging or believing the thing or person to have value (to confer a benefit, to make a positive difference). Thus a person can love an old picture (value it in sense 1) yet not believe it to be a particularly good picture -- one that would be worth people's time to observe and study (value it in sense 2). Perhaps such a picture has only "sentimental" (as opposed to aesthetic) value to the person who prizes it.

(c) When we speak of the values of individuals and groups we generally mean their tendencies to devote their resources (time, energy, active intelligence, money, etc.) to the attainment of certain kinds of ends. Values are the beliefs which direct their lives, which guide behavior in situations where there is choice. Again following Baier, a person's dispositions to devote his resources in certain ways constitute his values if he believes

them to be beneficial, to be good ways of expending his resources, or to make his life better than other ways would.

To speak of values in this way puts them within the sphere of reasonable discourse; people justify and defend their beliefs with reasons. The idea of values as beliefs helps us distinguish values from other forms of striving or wanting to have. A person may strive compulsively for wealth and material possessions. We would not conclude that the person has materialistic values; he or she may never really have considered likely effects of these strivings, or available value alternatives. He might desire material possessions without stopping to really judge the disposition to strive for them as of value, as conducive to happiness. In that event the values formation process, while started, has never been completed; the person really has no well-formed convictions in this area, only blind strivings.

One essential element in values education is the opportunity for thinking about our values so that the soundness of our beliefs and convictions may be tested and better grounded in reason.

The idea of values as beliefs also suggests that we can at least consider values (like other beliefs) as true or false, or at least subject to rational assessment. A person may believe that a certain pattern of commitment and striving is desirable, will work out for his or her own good and the good of others, and maybe it will. But when this belief works time and again against the good, when the difference it makes is not positive but negative, we can argue cogently that this value-belief is "false" or at least unsound and harmful, and should be re-considered.

Thus, to bring values into the sphere of thinking and reasoning is not at all to say that values are "relative" -- that each person's values are best for him or her or that everybody's values are equally reasonable. We can make our values more sound and more secure by reflecting on our experience -- on the conditions which promote our happiness and that of others.

But our own reflective thinking is only one factor, and a relatively late one, in the development of our values. Like all our beliefs and convictions, our values are influenced by significant people in our lives, family members, peers, powerful figures in society, and increasingly in our "information age," the communications media. Such influences may be beneficial or harmful. People are harmed by having "false" values, values which lead them to squander their intelligence and energy without achieving their good. When we speak of the impacts of science and technology on the dominant values in society, this is what is at stake.

Moral systems and religions are attempts to codify the best values, those which best promote the good. They are important sources of insight for reflective thinking about changing values in society.

The Human Good and Well-Being. We have noted that well-functioning institutions are adaptive tools for securing needs and establishing the structure for pursuing our values and goals in life. Our values are our convictions about what has value, what is worth devoting our resources of time and energy to experience and secure, which provide guideposts for living and the pursuit of happiness. But what is happiness or well-being? What is it for a human being to be doing and faring well? The rough idea is that a person is doing and faring well (or enjoying a good life) to the extent that the life is moving in the direction of an "ideal pattern of life" as established culturally or personally. We can break this idea down further and say that people are doing or faring well, and are enjoying a happy life, to the extent that they meet these conditions:

(i) they are able to secure their basic common needs (e.g. food, clothing, shelter, basic rights, social relationships) within the range of expectations established by community norms;

(ii) they have personal goals and aspirations which are at least somewhat demanding throughout their lives in terms of energy and intelligence -- for then their lives are active, "about something" and "meaningful;" and

(iii) these goals and aspirations, and their pursuit, give adequate scope to the individual's values; they engage in activities and relate with people whom they really prize, appreciate, or enjoy and judge to be valuable;

(iv) these goals are seen to fit into a larger whole which is appreciated in terms of scientific theories, myths and allegories, rituals of civic religion, etc.

(v) they are moving forward in their plans, working towards the achievement of their aspirations.

These five conditions also point to some basic forms of unhappiness. (i) When people cannot secure basic needs they become desperate or ill. (ii) When they have no aspirations they are "drifting" -- going nowhere. Similarly, when their aspirations are insufficiently demanding they can easily fall into lethargy and malaise -- the "five easy pieces" syndrome. They can easily become withdrawn, alienated and disengaged from life. (iii) When their goals derive from social conditioning but are not aligned with their values, then they may achieve their goals and be regarded externally as "successful" but not enjoy or think worthwhile the minute to minute and day to day routines of

life -- they live lives of "quiet desperation. (iv) When they cannot relate their own achievements in life to a larger vision of the good of the community, or humanity, then there is the risk of alienation and "meaninglessness." A defensive or even paranoid barrier (as with Howard Hughes) may result from such isolated achievement. But (v) when people set their sights too high they have another problem -- stress and strain and effort without satisfaction -- and they become "burned out cases."

Impacts of Science and Technology. We are finally in a position to relate "impacts of science and technology on society" more concretely to values and to the well-being of people. When we speak about investigating and understanding these impacts, we may be concerned with two sorts of relations.

The first is "sociological." We can study how particular scientific discoveries and technological innovations, or the organization of the science and technology institutions, as independent variables, affect social norms and values as dependent variables. An example of such a "sociological" question would be: did birth control pills affect religious values of Catholics, or norms of sexual morality? These are "factual" questions, questions of social science.

The second relation is "axiological" or "value-laden." In this case we are trying to understand how scientific discoveries and technological developments actually affect people for good or for ill, how good these things are not in their own terms, but for humanity. We may say that science and technology affect the well-being of people in three quite different ways: (i) by directly affecting their basic needs, (ii) by affecting the social structure within which they define their good and build their lives, and (iii) by creating new cultural opportunities. Let us take a brief look at each:

(i) Impacts on basic needs. A vaccine can cure an illness, auto emissions can cause illness, chemical fertilizers can affect food and water safety. Science and technology can impact on many basic biological needs in this way. Deontological ethical theories (chapter 2) emphasize basic rights possessed by all people, especially basic needs such as safe air, water, food, and shelter and meaningful work. These theories will call immediate attention to any effects of science or technology which impinge on such rights. Utilitarian theories, while perhaps de-emphasizing the notion of rights, will also place a strong emphasis on basic needs as essential components of the human good which they seek to optimize.

(ii) Impacts on social structure. Institutional norms are tools for securing needs; values are beliefs and convictions about what has intrinsic worth or conduces to well-being. Industrial technologies of production make more material goods

available, but our norms respond (through the mediating influence of advertising, etc.) so that we also expect more and even think that we and our families "need" more. That is what "keeping up with the Jones's" is all about. So the technological shift tends to bring materialistic values in its wake. And such values themselves may be bad for people, either because they are insatiable, or because they fail to bring the most out of people by way of their deepest energies and intelligence, or because they make happiness excessively vulnerable to collapse in the event of mere economic changes of fortune, which are common in all eras.

(iii) Creation of new opportunities. Science and technology, like the arts, are vocations, and like all vocations they deeply affect those who take them up. Each vocation, or "calling," involves a structure of inherent values. Scientists stake their happiness on discovery, engineers on efficiency. Samual Florman speaks of the "existential pleasures of engineering." Others note that technical modes of thinking and working are frequently shallow and unsatisfying when compared with "craft" modes which were common prior to the industrial revolution.

Socially responsible individuals in our technological era are those who (a) seek to <u>understand</u> how changing science and technology are affecting people in our society for good or ill, who (b) actively think about and <u>decide</u> what is right and best for society, and who (c) make a commitment to <u>participate actively,</u> both as individuals making personal decisions and as members of society bringing their values to bear on collective decision-making, to make a positive difference. The responsibility cycle is a framework to organize education to promote responsibility, and to that we now turn.

## II. THE PHASES OF RESPONSIBILITY CYCLE

### <u>Phase (1): Self-Understanding.</u>

Criterion 1 states that STS develops the learners understanding of themselves as inter-dependent members of society, and of society as a responsible agent in the eco-system of nature.

Let us break this into its component parts. The starting point is the learners' understanding of themselves as individuals and interdependent members of society. In our society each learner is to be valued as a unique individual, with values, talents, goals and plans of his or her own. As a citizen each is guaranteed basic liberties to live as he or she decides, and is responsible for his or her own life. That is fundamental to our way of life.

But the criterion notes that the learner is not an island unto himself, but rather lives among others and suffers the consequences of their actions, and in turn others must bear the consequences of his. Because they share the planet earth as their home, the well-being of one cannot be isolated from that of the others. They are interdependent. So the learner must come to understand that he or she is also a responsible agent in the capacity of citizen. The way we live affects the eco-system which sustains the basic needs of life, and we are to be held responsible for making these decisions well, through the various decision making and problem-solving processes of our democracy.

Activities of Self-Understanding

In the first phase, a learner's work consists in identifying his or her own beliefs, convictions, images of the good life for self, our society, and the world community. What are his images and ideals, what does he think it will take to move these toward realization? What role does he wish to play herself?

The learner also explores what she believes and knows. What does she know, either through television, reading, or first-hand experience, of the technology-related problems and issues of her time, or that are forecast for her future? What are her feelings? Is she frightened about the bomb, pollution, running out of resources, prospects of de-humanized employment? Has she "blocked out" information about these topics, denied their relevance to her? Are there conflicts in her hopes for her own life and her knowledge about the significantly worse (or better) prospects of others.

In the work at this phase the learner also explores: what are the sources of my beliefs and convictions, and what does this indicate about their quality? How did I come to hold these values, form these hopes, think and feel as I do? How secure are my roots? What are the special needs, particular responsibilities, of my group?

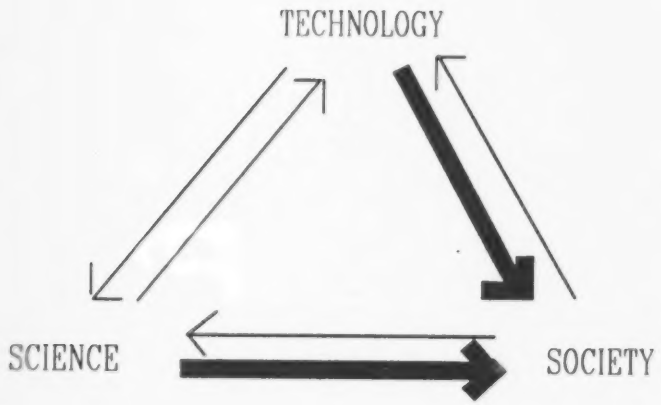
Responsibility sets the context for the work at this and every other phase of the cycle; the work is never merely academic in nature. The learner is never a mere spectator; as an individual and member of society he or she is encouraged to enter the world with a responsibility-oriented perspective. From that standpoint people, events, things enter the learners field of perception, thought and concern. In an important sense, they are reflections of the learner. For what enters his world, and how he construes it, how it lives and dwells in his awareness, reflects his inner self, his deeper attitudes and purposes, concerns, fears and aspirations. In this phase we seek in many different

ways to bring home to the learner that his world is a "personal reality," that he plays a large part in "authoring" the world in which he lives, that he is responsible for the character and quality of the world of his experience.

In facilitating the work at this phase, teachers may encourage personal sharing, probe for deeper meanings, conduct discussions of experiences or readings, suggest journal-keeping. Values clarification techniques may be utilized. Regardless of tactics, learning is focused on the learner, and a context for STS conceptual knowledge and issues awareness is laid within the learner's own field of awareness and concerns.

**Phase (2): Study of and Reflection on STS Patterns and Issues.**

Criterion 2 states that the mutual relations of science, technology, and society on each other are clearly presented. As Figure Three indicates, there are six of these relations to present. But Criterion 3 identifies two of the six for especially early, clear, and compelling presentation, in order to capture the learners attention -- the impacts of science and technology on society. The STS learner, in the course of deepening self-understanding and developing attitudes of responsibility, is to attend to these relations in issue after issue.



Societally relevant issues. As discussed earlier, scientific and technological institutions, and the new discoveries and innovations emanating from them, have complex effects. They secure the needs of some while harming others. They bring about changes which some view as positive and others as negative. They create new opportunities for some, but destroy opportunities for others. Investigations are intended to clarify these impacts, and if possible to lead to a decision about what is right. But there is frequently considerable obscurity regarding what the impacts are, and whether they are good or bad. Different individuals and groups rely upon different interpretative and analytical methods and tools to gain some understanding, however indeterminate and fallible, of these impacts -- everything from cost-benefit analysis to biblical exegesis. Not surprisingly, there are often incommensurate investigations and results.

We may talk about a "technology-dominated issue" when different groups in society have basic differences in how to interpret and address technology-related problems. The approaches of the different sides may stem from very basic interests (e.g. the tobacco industry's interests bearing on its assessment of the health effects of smoking), or be influenced by strong value convictions. Either way, they cannot significantly be advanced using available interpretive or analytical tools. That leaves "basic" differences on how to interpret and address the problem. Then the problem becomes a social "issue," and political factors are added to the technical and cognitive ones. The problem solving activities, the technology assessments, may then be more in the nature of a negotiated settlement than a scientific inquiry or an engineered "fix."

Recognizing the essentially contested nature of technology-dominated, societally relevant issues, Criterion 4 states that in STS study and reflection, the materials present a balance of differing viewpoints about the issues and options, without striving to hide the viewpoint of the author.

The Activities of Study and Reflection

The work at the second stage consists in gaining awareness and understanding about particular scientific and technological developments and their impacts -- how they promote and maintain the good of some, how they prevent and constrain the good of others. It consists in learning about people, things, events, ideas, and issues in the learner's world, and reflecting on them to deepen understanding and draw implications for decision-making and social action. It involves understanding the nature of science, technology and society, and their mutual interactions. It involves illustrative case studies, explored for sociological and axiological implications. Ethical and value theories and applied ethics are potential resources for structuring these explorations.

Work at this phase provides one set of connection points with the discipline-based elements of the curriculum, for the science, mathematics, engineering technology, and social science learning surrounding STS. Work at this phase includes what Hungerford and Rubba call issue awareness and issue investigation. It includes much of the didactic teaching and seminar-discussions for understanding values discussed in the SSEC STS Curriculum Framework (Hickman, Patrick, Bybee, 1987).

**Phase (3): Decision-making**

Criterion 5 states that STS material must engage the student in problem solving and decision making. This is particularly important in light of the indeterminate nature of the issues. It would be all too easy for escapist, anti-responsibility attitudes to hide behind this indeterminacy and says in effect "there is no way of making rational headway on these issues. One group sees it one way, another sees it differently. That's all there is to it."

This criterion says that impersonal subject matter learning, and indeterminate thinking in which the learner fails to resolve the issue for him or herself is insufficient. It is not enough to learn "about" energy, or whales. The student must confront the information and alternatives and then go beyond them, make a decision, take a stand, judge one path as the right or best one.

The Activities of Decision-Making

Work at this stage consists in learning about the decision-making process, making decisions, and defending them by providing reasons and evidence. Various analytical and pedagogical tools may be useful, such as decision-trees, and Kohlberg dilemmas. Classroom debates, technology assessment exercises, mock parliaments and courts, and many other techniques, can enliven this work.

This phase also provides connecting points for the basic liberal arts elements in the curriculum. Students learn to think by writing, express their opinions in persuasive writing and speaking, learn to focus reasons and evidence logically upon a conclusion.

**Phase (4): Responsible Action.**

Criterion 6 says that the material encourages learners to become involved in a societal or personal course of action after weighing the tradeoffs among values drawn from various scenarios or alternative options.

This criterion says that STS education must go beyond academic rationality. Words are not sufficient, even when they express value judgments and decisions. The materials must be presented in such a way as to encourage the student to become involved in action, either alone or in concert with others through either an informal alliance or an established public interest group.

Stopford Brooke expressed this well:

> Whatever feelings and hopes we have, we are bound to shape them into form in life, not only at home, but in the work we do in the world. Whatever we feel justly we ought to shape; whatever we think, to give it clear form; whatever we have inside us, our duty is to mold it outside of us into clear speech or act. The secret of education and self-education is to learn to embody our thoughts in words...to realize our knowledge in experiment, to shape our feelings into action; to represent without us all we are within; and to do so steadily all our life long.

The Activities of Responsible Action

Work at this phase consists in charting and undertaking individual or social courses of action. These may include organizing a community meeting, joining a public interest group, working in an environmental cleanup project, traveling to the state legislature to lobby for pending legislation, joining in a consumer boycott of an environmentally unsafe product, organizing a performance to get money for family farmers or hungry children. This work may be sponsored by community organizations, such as an urban gardening project sponsored by the horticulture society, a household chemical removal project sponsored by the environmental health council, a river basin clean up project such as the Rouge Rescue in Michigan.

**Phase (5): Integration**

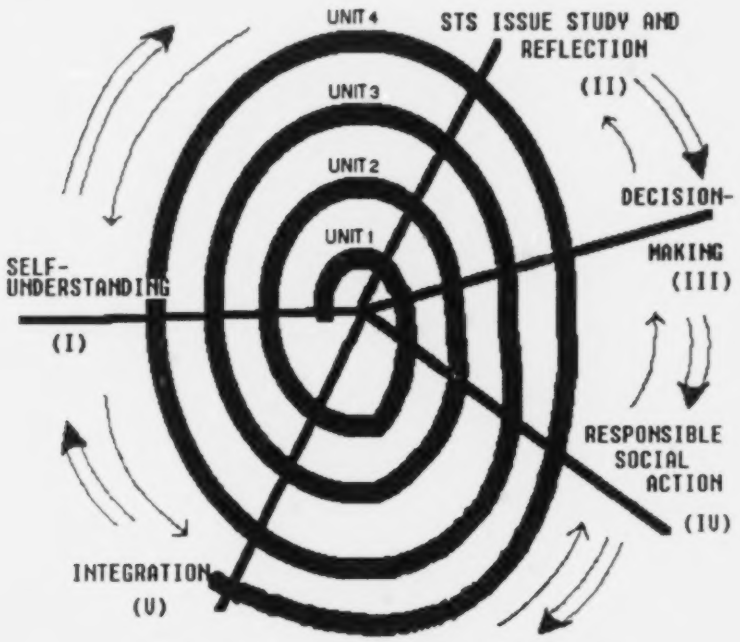
Criterion 7 says that the learner is to venture beyond specific subject matter to broader considerations of science, technology and society including a treatment of personal and societal values/ethics.

This criterion says that a presentation on any specific technology-dominated issue or even set of issues is simply not enough. It is insufficient for students to be led through a "decision" or even an "action" on issues identified in curriculum units. The units provide "illustrative cases" and the learners must be assisted in venturing out from these cases, seeking patterns, hazarding generalizations, considering principles,

forming a personal standpoint from which new technology-dominated issues can be identified, investigated, assessed and addressed through various available social and political processes.

## III. APPLYING THE RESPONSIBILITY CYCLE

The "responsibility cycle" framework organizes the sequence of teaching-learning about ethics and values concerns into a cycle with five phases. It notes that there is a primary direction in the formation of responsibility, from self-understanding through study and reflection through decision-making, to action and back to self for holistic integration. (Note large arrows). Hence, curriculum moves primarily in that direction. And it notes movement in the contrary direction (note small arrows).




**PHASES OF THE RESPONSIBILITY CYCLE**

Here are some important considerations in implementing the responsibility cycle:

(1) The five phases are distinguished to assure proper attention to each.

In day to day living, the separate "phases" are integrated. All people from time to time stop to consider their needs, values, plans, responsibilities, etc. (phase one), study, trace patterns, reflect, (phase two), make judgments and come to decisions (phase three), act upon their convictions (phase four), and re-evaluate their values, plans and responsibilities, integrating experiences undergone and actions taken and forming some general ideas and principles (phase five). The responsibility cycle distinguishes these five phases, in order to focus needed attention on each. This attention strengthens the learners "work" at each phase and contributes to a sense of balance and completion in the learners thinking and valuing processes.

(2) The STS curriculum is focused on responsibility: it begins and ends with the learner as a responsible individual and as a responsible member of society.

Learning is something learners do, through such acts as thinking, organizing, hypothesizing, writing, sharing, listening. Teachers can set up good or bad opportunities for learning activities, but only learners can engage in learning. And each learner learns his own lessons. Learners are active, need-motivated, goal directed people. The time and energy they allocate to learning, and the learning activities they engage in (or fail to engage in) stem from their short and long term goals, whether conscious or unconscious, wise or reckless.

This is especially true when we turn from cognitive learning, which may for many learners never penetrate beneath the surface to the dynamic inner core, to learning related to the formation of values and especially those which comprise responsibility. STS education is the battle for the heart and soul of the learner, at least in his secular and public capacity. Hence the learner is the alpha and omega, the beginning and the end, of the responsibility cycle. The cycle starts with a dialogue with the learner, exploring growing concerns, a maturing willingness to try new responsibilities on for size. And it ends with further dialogue, to discover areas where acknowledgment is needed, concerns have matured, demands may be stepped up.

(3) While STS units, courses, and programs may use the cycle as an external structure, the framework mandates only that the curriculum manages an appropriate allocation of work to each phase.

The responsibility cycle is central to STS teaching and learning. But the STS approach also has implications for the selection and treatment of science, engineering and technology,

social science, language arts, and quantitative content. As Hungerford and Rubba indicate, all of these materials can be organized in a careful sequence toward decision making and action goals. But they can also be organized in many other ways.

Ethics/ values issues may be treated in separate units or so skillfully integrated into the rest of the curriculum that no one ever is self-consciously focused on "ethics and values," or "responsibility," per se. In some communities, this would be a tactical advantage, due to opposition to "values education." The framework mandates that however the STS curriculum be organized, an appropriate allocation be made to each phase of the responsibility cycle, and that materials and activities be so selected and sequenced.

(4) The curriculum as a whole is analyzed, and when necessary re-organized, to assure proper balance for and sequencing of the five phases of the responsibility cycle.

There are better and worse contexts for the work at each phase of the cycle. Self-understanding work requires different conditions than systematic reflection or action. At each level of education, the framework raises the question: how is each phase in this cycle addressed? It does not assert that every STS unit, regardless of topic or length, must provide an equal share of work at each phase. But it does assert that there must be balanced and appropriate attention to each over the course of the STS units, throughout the school year, across the curriculum, and at each educational level (elementary, secondary, collegiate, grad/ professional, and adult/ continuing).

With adequate planning and coordination, the work at each phase may be distributed to ideal points within an integrated curriculum: more phase two and three work in science, phase four and five work in social studies, more self-understanding work with the counseling staff, more action in community based internships, etc. But even in the absence of this sort of coordination, no phase may be neglected. The framework encourages the analysis of the total curriculum to ascertain that appropriate attention is devoted, in proper sequence, to work at each stage of the cycle. Each unit, each course, each school year, and the entire program at each level is to be explored to ascertain where work at each of the phases may be found. The curriculum may be strengthened to strengthen those areas which are weak, and to sequence the work in a meaningful way: e.g. self-understanding work early in the school year, holistic integration at the end, more serious decision making and action taking in the later years, etc.

(5) The responsibility cycle is the "inner core" of STS education. It is surrounded by the rest of the curriculum, often linked to the core in creative ways.

STS will be implemented in both free-standing STS courses and as components in (discipline-based) science and social studies education. The National Science Teachers Association has mandated that roughly 20% of the discipline-based science courses be STS. The articulation between STS and the rest of the curriculum may be strong or weak; the curriculum components may be mutually reinforcing or at odds with each other.

(6) As students grow in maturity the meaning of the learner's work at each phase -- self-understanding, reflection, decision, action, and integration -- evolves.

Learners grow up, attain greater self-consciousness, a greater sense of personal identity. They come to possess a more definite concept of "self," and hence attain self-awareness in a deeper sense of that term. They can accept increasingly significant responsibilities in their personal lives, their families and in the community. The status "student" itself is important. While some young people leave school and are forced to "grow up," others retain the student role longer and experiment with various roles, act inconsistently and even foolishly at times. But we are not likely to extend special privileges of this sort of professional school students, even if they are in their early twenties and just out of college, and as a society we are now re-considering the demands we impose on our college, and even secondary students, in the call for community service (Boyer, 1983).

Developmental psychologists working within a variety of paradigms have much to contribute to the selection and sequencing of learning activities. The responsibility cycle points us in the direction of the essential developmental questions, and indicates where insights from theory and research are needed. These insights help us determine what is practicable and appropriate work at each phase of the values cycle at the various educational levels.

Take the case of action. By including young children in a neighborhood cleanup effort, a basis may be laid for later attitudes and habits. When they participate in moral dilemma discussions, we recognize that this is quite different than an older student coming to a personal decision, followed by personal or group action, on a controversial community issue. We know that in the early secondary years students are struggling with a dawning sense of personal identity, and such decisions have one kind of meaning, while by the end of the secondary years they are expected to play an increasingly responsible role, take part in community decisions, vote in state and national elections. .pa

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**NATIONAL STS NETWORK**

# S T S

A Support Network for the Implementation
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Working Paper 2

## ETHICAL CONCEPTS AND THEORIES FOR STS

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Rensselaer Polytechnic Institute

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*1988*

# ETHICAL CONCEPTS AND THEORIES FOR STS

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In order to become responsible agents, it is essential that students engage in a process of forming their own ideas about ethical issues, and that they come to understand the underlying reasons for societal or shared values. This process might be thought of as engaging in philosophical inquiry. When the inquiry is about ethics, we call this philosophical ethics. Philosophical ethics is concerned with the concepts and theories that explain and systematize claims about values, right and wrong, obligations, etc.

Science and technology often impact our world in ways that pose new ethical and value issues or that call upon us to reinterpret and extend traditional moral notions. The issues may be posed to the individual -- should I give my organs for transplantation? should I take a job in a plant which produces new and controversial chemicals? should I use my computing skills to develop military systems? -- or to a society or community as a whole -- should we allow a toxic waste disposal plant to be built here in our region? should we as a nation invest in more research on reproductive technologies? should we automate airplanes to such a degree that human pilots are on longer necessary? In either case, the increasing role of science and technology in our society means that to be responsible adult citizens in the future, our students will need analytical and conceptual tools for dealing not just with ethical and value issues, but with the ethical and value implications of science and technology.

These tools can only be acquired when students are given the opportunity to develop their own ideas, have them discussed and critiqued, hear other, new ideas, etc. As Socrates said 2500 years ago, "the unexamined life is not worth living."

The aim of this chapter is, then, to explain some of the concepts and theories that philosophers have found particularly useful in discussing moral issues. As well, the aim is to illustrate just how a dialogue on ethical issues can go on, and how it can progress from the statement of a kernel of an idea, to clearer ideas, new insights, and new and better questions. The idea her is not so much to provide material to be memorized as if

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it were factual, but rather to provide ideas, examples, and direction to facilitate inquiry. The aim is to engage students in reflection on morality.

Philosophical ethics is based on the presumption that it is not sufficient for individuals merely to have moral intuitions or moral commitments. One should have reasons for one's beliefs and be able to give an account of these. Human beings are unique in their ability, and indeed their natural tendency, to try to understand. In the case of morality, we aim at general rules or principles that can be applied consistently from one case to another. Thus, for example, instead of having separate views on abortion and capital punishment, we recognize that positions on both of these controversial issues involve claims about the value of human life and what abrogates it. We should consider whether our views on abortion and capital punishment are consistent with one another, and if they are inconsistent, we either change our ideas or try to explain how the apparent inconsistency is not real.

In engaging in philosophical inquiry about ethics it is most important to realize that it is an ongoing process, and that it involves a variety of activities: formulation of initial ideas; critical examination of these for their coherence, their compatibility with moral intuitions, their consistency, etc.; reformulation of ideas, which involves rejecting some and modifying others (often in favor of deeper, more encompassing ideas); re-examination of the new formulations, perhaps again rejecting some parts and modifying others; etc. Philosophers often refer to this process as a "dialectic" (which is related to the word `dialogue'). In addition to moving from one idea to better formulations, the dialectic also moves back and forth from examples or cases to theory. Thus, one may start with the abortion issue; formulate a principle about the value of human life and its priority among the system of values; spend some time understanding the role and importance of this value in our culture; test the principle about the value of human life against other cases such as capital punishment and euthanasia; perhaps reformulate the principle to account for the exceptions we seem to make to it which have come to light by consideration of the new examples; and so on. This dialectic does not always lead to final conclusions about ethics, but it is important to emphasize that knowledge and understanding can be gained, progress can be made, even when one has not reached final conclusions.

In our everyday lives we often overhear or participate in discussions of ethical issues. Think, for example, of the heated discussions you have heard about abortion, welfare reform, or race discrimination. The participants often defend their opinions on the basis of their emotional responses or their strongly held intuitions about what is right and wrong, admirable and evil. These responses are starting places for philosophical

inquiry about ethics, but only starting places. Discussions at this level may quickly end unresolved because the individuals involved are not able to articulate reasons for their moral opinions. As such it is impossible to resolve the issue or even to truly understand the real differences between people.

In addition to helping to get at the underlying reasons for many moral intuitions and systematizing these reasons, ethical principles and theories provide some common ground for discussion. They establish a common vocabulary and articulate frameworks within which or against which we can articulate our moral ideas. While there are other sources of values and moral concepts and theories, including, most notably, the world's religions, the focus here will be on traditional philosophical concepts and theories.

[Much of what follows draws on Chapter 1 of the author's book, Computer Ethics (Englewood Cliffs, NJ: Prentice Hall, Inc., 1985).]

## Descriptive/Normative

It will be helpful at the onset to be aware of an important distinction between the kinds of claims that are made in moral discourse. Descriptive statements are statements about how people in fact behave. The following statements are descriptive: "When people are shown this picture, 60% think it is a butterfly"; "Only 40% of all Americans believe that premarital sex is wrong"; "In all human societies, there is some areas of life that are considered private." We call these statements descriptive or empirical because they describe what people do or think. They describe a state of the world. As such they may be confirmed or disconfirmed by observation. Social scientists gather empirical data and report their findings, both on moral and nonmoral matters. When it comes to morality, psychologists and sociologists might do such things as identify processes by which children in our society develop moral concepts, or they may measure various values and value changes in people. When anthropologists go to other cultures and describe moral rules that are adhered to in those cultures, they also are doing empirical studies of morality. Similarly, historians may trace the development of a particular moral notion in an historical period. To use a computer example, sociologists might survey people or observe their behavior and conclude that people tend to view the use of someone's computer account quite differently than using someone's bank account.

When social scientists do these studies, they are studying morality, but they are studying it as an empirical phenomenon. They are describing what people think and do. In contrast,

philosophical ethics is prescriptive or normative. It is concerned with showing not what people actually do, but rather what people ought to do. Ethical theories aim to find the basis for saying that people have an obligation to behave in a certain way or that it is wrong for someone to behave in a certain way. Descriptive facts about the world may come into play in the dialectic about ethics, but it is important to keep in mind that the issues of philosophical ethics cannot be resolved just by pointing to the facts about what people do or say or believe. The fact that people tend to view using someone's computer account as quite distinct from using someone's bank account, for example, says little about the moral equivalence of these two acts.

Let us begin our discussion of ethical theories and concepts with an idea that is very likely to come up in the classroom. Students are quite likely to feel that "ethics is relative." This is a common intuition that some have attempted to formulate into a theory. While this claim is too often a means to avoid an analysis of ethical beliefs, it is important to see that this idea too can be formulated into a theory. Indeed, it is a theory that has been much discussed by philosophers over the years.

## Ethical Relativism

The theory of ethical relativism has both a negative part, i.e., something that it denies, and a positive part, i.e., something that it asserts. The negative part is the claim that there are no universal moral norms. One person may decide that it is right for her to tell a lie in certain circumstances, another person may decide that it is wrong for him to tell a lie in exactly the same circumstances, and they could both be right. Right and wrong are "relative." Ethical relativists deny that there is a universal right and wrong.

The positive claim of ethical relativism is harder to formulate. Sometimes ethical relativists assert that right and wrong are relative to the individual and sometimes they assert that right and wrong are relative to one's culture, or some smaller group, or the society in which one lives. Let us consider the latter form which is probably the most commonly held version. The negative and positive claims of ethical relativism would then be summarized as follows: "There are no universal moral rules. Right and wrong are relative to one's society."

Ethical relativists cite a number of facts to support their view. (1) They point to the fact that cultures vary a good deal in what they consider to be right and wrong. For example, in some societies infanticide is acceptable, in others it is considered wrong. In some societies, polygamy is permissible, in others it is not, etc. (2) Relativists also point to the fact that moral norms change over time so that what is considered wrong at one time in a given society may be considered right at

another time. For example, slavery was considered permissible at one time in our society, but is not permissible now.
(3) Relativists also point to what we know about how people develop their moral ideas. These are usually taught to one as a child, and are the result of one's environment. If I had been raised in certain middle eastern cultures I might still today believe that it is wrong for a woman to appear in public without her face covered. Yet because I was raised in the United States, I do not believe this. A person acquires moral beliefs from his or her family, from experiences in his or her society, at school, at work, etc.

Note that at this point we have made progress simply by formulating clearly and systematically an idea which students have entertained but have not examined. Now the idea and purported evidence must be examined.

The facts which ethical relativists point to certainly cannot be denied. That is, we cannot deny that there is and always has been some diversity of opinion on morality, that moral notions change over time, and that environment plays a part in the moral ideas one has. The problem for the relativist is that these facts do not seem to support either the negative or the positive claim of ethical relativism.

What the ethical relativist seems to forget is that a moral code may apply to people even though they don't recognize or follow it. The fact that all people do not follow the same moral code is not proof that there is no universal moral code. Likewise, the fact that we learn moral beliefs from our environment says nothing about the rightness or wrongness of what we learn. If I had been brought up in another society at another time I might have believed that sacrificing human beings during certain religious ceremonies is permissible, but this does not make it right.

Moreover, while we have to accept the fact that people seem to differ in their ideas about morality, from culture to culture and from time to time, the diversity may be superficial rather than real. Relativists seem to be focusing on specific practices and there is still the possibility that universal norms underlie these. Several possibilities are worth considering here. Moral theories usually put forth very general principles such as "never intentionally harm another person" or "always respect human beings as ends in themselves." These principles are of such generality that they might be said to be acknowledges (or operative) in all cultures, though in each culture or time period they are interpreted differently. What is meant by "harm," "respect," and "human being" varies. Thus, it is possible that people at all times and places follow universal norms, but that this is hidden from sight due to the diversity of expression or interpretation of the norms.

Social scientists have tried to find patterns within the diversity. Some have asserted, for example, that all cultures have prohibitions on incest or, more recently, that while there is a great deal of diversity about what is considered private, all culture consider some aspect of the lives of individuals private.

In a moment, when we examine utilitarianism, we will see an example of a very general moral principle which might lead to a diversity of practices. Utilitarianism says that one should always do what will maximize good consequences. Clearly people in quite different situations may be doing quite different things and still all be acting in accordance with such a rule.

In any case, the facts pointed to be relativists, do not support the negative claim of relativism. The facts do not establish that there are no universal moral rules. The facts cited by the relativist also do not support the relativist's positive claim -- that right and wrong are relative to one's society -- for pointing to what people believe to be right and wrong, tells us nothing about what really is right or wrong. The fact that people behave in accordance with the norms of their society is not evidence for the claim that they ought to.

Indeed, if we look more carefully at the positive claim of ethical relativism, we find that ethical relativism is not just unsupported, but is incoherent as an ethical theory.

In saying that right and wrong are relative to one's society, ethical relativists appear to be saying that one is bound by the rules of one's society. This means that people ought to abide by the standards of their society. What is right for me is defined by my society and what is right for a member of an African tribe is what is set by the standards of his tribe. Notice, however, that relativists have now slipped into an inconsistency. While denying that there is a universal norm, the relativist has asserted a norm, namely she has asserted that people (all people) ought to abide by the rules of their society.

Ethical relativists can only avoid this inconsistency by avoiding making any normative statements whatsoever. Once they make a claim about what people ought to do or what norm they ought to abide by, they commit themselves to a universal principle. Thus, it would seem that relativists must give up the positive claim, that people ought to abide by the rules of their society. But, then what is left of relativism? All relativists can do is point to the observed diversity of moral beliefs in the world, and our understanding of how people acquire moral beliefs. In doing this they are making descriptive claims. As such, they have no ethical theory.

Case Illustration

To see these and other problems with ethical relativism, consider a hypothetical case. Suppose by a distortion of history that computers were developed to their present sophistication fifty years ago. World War II is in progress, though the United States has not yet entered the war. You are head of international sales for a large computer company like IBM. You have just been contacted by the German government because they want to purchase several of your largest computers. Rumors of what is going on in Germany have been reaching the U.S. so it is not difficult for you to imagine what the German government will use the computers for. The question is, should you sell the computers to Hitler?

In reality the decision would most likely not be entirely in your hands, but let us assume that it is. If you are an ethical relativist, it would seem that you have no reason to refrain from selling computers to Hitler. You may know full well that Hitler plans to use the computers to keep tabs on all citizens and to track down Jews, as well as to wage war against other European nations. Such activities would be considered wrong in your society, but perhaps not in Hitler's.

Actually, this suggests several practical problems with ethical relativism which have not been mentioned before. How do we figure out what the standards of a society are? You might raise questions about whether Hitler is abiding by the standards of his own society or whether he is going against these. If he is going against these, then perhaps he is doing wrong and you would be doing wrong to support him, but it is not easy to tell whether Hitler is adhering to or rejecting the standards of his society. Are standards set by leaders, masses, majorities?

This leads to another problem with relativism. It seems to rule out any form of rebellion. If someone rebels against the standards of his society, he is wrong according to ethical relativism. Many of our most notable heroes would then be considered people who had done wrong, e.g., Socrates, Martin Luther King, Ghandi, and even Jesus.

In any case, as an ethical relativist you could make no judgments about Hitler's activities. You would have no moral basis for refusing to sell the computers. You could only claim that most people in <u>your</u> society believe it is wrong to do what Hitler does. Indeed, what reason can the relativist give for himself believing that Hitler's actions are wrong. All she or he can say is, again, that most people in her or his society believe that mass extermination of Jews is wrong. This hardly seems an

adequate reason for adopting a moral belief. Thus, ethical relativism provides a very weak basis for anyone to make a moral decision. It provides little insight for those facing a moral choice.

To summarize, ethical relativism seems to suffer from three types of problems. First, the evidence that is used to support it, does not definitively support it. Second, proponents can not make normative claims without inconsistency. By claiming that everyone is bound by the rules of their society, the ethical relativist makes a universal claim. And, third, the theory has problems which make it hard to use. How do we decide what group a person belongs to, in order to know what code applies to him or her? How do we justify any of our moral beliefs except by saying "because thats the way it is in my society"? Of course, one can give up the positive part of the ethical relativism and simply make the negative claim that there is no universal moral code, but, then, one has no normative theory. All one can really say is that "it appears that" there is no universal agreement about right and wrong.

Thus, while we have succeeded in formulating one of our intuitions about morality into a theory, after examining it, the theory looks untenable. Remember, however, that the dialogue is not over. We may be able to capture part of what relativists are concerned about in another theory.

## Utilitarianism

Let us now try a somewhat different tact. We can take some of the insights of relativism and consider a theory which makes a universal claim, but has a "relative" aspect insofar as the universal claim implies different norms for people who are in different situations. Utilitarianism is such a theory (though not the only one) and it has been very influential.

Utilitarianism can be characterized as a form of consequentialism. "Consequentialism" refers to any type of ethical theory in which right and wrong are based on the consequences of an action. Utilitarianism claims to provide one simple moral principle which everyone ought to use to determine what he or she ought to do in a given situation. The basic principle is that everyone ought to act in ways which bring about the greatest amount of happiness for the greatest number of people. Let us begin with the "proof" that utilitarians give for the validity of this simple principle.

## Intrinsic and Instrumental Value

Utilitarians derive the principle of utility by focusing on values and asking what is so important, so valuable to human beings that we can use it to ground a moral theory. They note

that of all the things in the world that are valued, we can distinguish things that are desired because they lead to something else, from things that are desired for their own sake. The former may be called instrumental goods and the latter intrinsic goods. Money is a classic example of something that is instrumentally good. It is not valuable for its own sake, but rather has value as a means to other things. On the other hand, something that is intrinsically valuable is desired for itself, for what it is, not just because it is a means to something else.

Having drawn this distinction utilitarians ask, what is there which is intrinsically good? What is so valuable that we can use it to ground a theory of right? Utilitarians conclude that happiness is the ultimate intrinsic good, because it is not desired for the sake of anything else. Indeed, they claim that everything else is ultimately desired as a means to happiness. To see this take any activity that people engage in and ask why people do it. Each time you will find that the sequence of questions always ends with happiness.

Take, for example, what you want to be when you grow up. Say, you want to be a movie star. Why do you want to be a movie star? Because you want to be rich and famous. We can still ask, why do you want to be rich and famous? First, why do you want to be famous? Because you want people to know who you are and admire you. But why do you want this? Because it will make you happy. Or, suppose instead that you said that you wanted to be famous so that you could become rich. Why do you want to be rich? Because you want security. Why do you want security? Because you don't want to suffer from needing things. Well, doesn't this amount to saying that you want to be secure so that you can be happy!

Now, we might have started with something else, some other goal that you have and, of course, we might have stopped the series of questions at any point and pursued questions about whether you are right to think any of these things will lead to any other. That is, we might consider whether being famous or wealthy really will make you happy, but the point that the utilitarian makes is that the series of questions we can ask about your desires will not stop until we get to something which is intrinsically valuable. Happiness is valued for itself and not just as a means to something else.

According to utilitarians, it makes no sense to ask why people value happiness. Happiness is the ultimate good insofar as all our actions are directly or indirectly aimed at it. It is what we all strive for. In a sense, utilitarians believe that this is simply part of our nature. It is a given that we are creatures who seek happiness.

Since happiness is the ultimate good, utilitarians believe that all actions must be evaluated in terms of their "utility" for bringing about happiness. Thus, they believe that all actions must be evaluated in terms of their "utility" for bringing about happiness. When an individual is faced with a decision about what to do, the person should consider his or her alternatives, estimate the consequences of each alternative and choose that action which brings about the most net good consequences, i.e., the most happiness.

So, the utilitarian principle provides a decision procedure. When you want to decide what to do, consider the happiness-unhappiness consequences which will result from your various alternatives. The alternative that produces the most overall net happiness (good minus bad) is the right action. To be sure, the right action may be one that brings about some unhappiness but that is justified if the action also brings about so much happiness that the unhappiness is outweighed, or as long as the action has the least net unhappiness of all the alternatives.

Be careful not to confuse utilitarianism with egoism. Utilitarianism does not say that you should maximize your own happiness. Rather, total happiness in the world is what is at issue. Thus, when you evaluate your alternatives you have to ask about their effects on the happiness of everyone. It may often turn out to be right for you to do something that will diminish your own happiness because it will bring about a marked increase in overall happiness. This is similar to the reasoning a soldier might go through in joining the army during a war.

The framework for decision making proposed by utilitarianism has become quite influential in our society, in particular in determining public policy. People often refer to "cost-benefit" analysis or "risk-benefit" analysis for decision making that involves weighing the potential benefits of a project, such as construction of a new nuclear power plant, against the potential harms (the risk of harm) in undertaking the project. The benefits from construction of a nuclear power plant really do come down to happiness in that they have to do with producing energy, at a cheaper cost, so that we can maintain and improve our comfortable life style. This benefit has to be weighed against the risk of harm from an accident at the plant, as well as the increased health costs and human suffering from workers or people in the neighborhood of the plant who might be exposed to radiation (a reduction of happiness).

Utilitarians do not all agree on just how utilitarianism is to be understood or used. One controversial issue of interpretation has to do with whether the focus should be on rules of behavior or individual acts. Some utilitarians have recognized that it would be counter to overall happiness if each one of us had to calculate at every moment what the consequences

of every one of our actions would be. Not only is this impractical, because it is time consuming, and because sometimes we must act quickly, but often the consequences are impossible to foresee. Thus, there is a need for general rules to guide our actions in ordinary situations.

Many utilitarians argue, therefore, that we ought to adopt rules which, if followed by everyone, would, in general and in the long run, maximize happiness. Take, for example, truth-telling. If people in a society regularly told lies, it would be very disruptive. One would never know when to believe what they were told. In the long run a rule obligating people to tell the truth has enormous beneficial consequences. Thus, "tell the truth" becomes a utilitarian moral rule. Other utilitarian rules might include "Keep your promises," "Don't reward behavior that causes pain to others," etc.

Act-utilitarians and rule-utilitarians differ, on the status they accord to these rules. Take a particular case where lying may bring about more happiness than telling the truth. Say, for example, you are told by a doctor that your spouse is terminally ill. You know your spouse well enough to know that this knowledge will make his or her suffering worse. Your spouse asks you what you and the doctor talked about. Should you lie or tell the truth? An act-utilitarian might say that the right thing to do in such a situation is to lie. A rule-utilitarian would agree that good might result from lying in this one case, but in the long run, if we cannot count on people telling the truth, more bad than good will come. Thus, one must adhere to the rule against lying.

Act-utilitarians treat rules simply as rules of thumb, general guidelines to be abandoned in situations where it is clear that more happiness will result from breaking them. Rule-utilitarians, on the other hand, take rules to be strict. We justify moral rules in terms of the happiness consequences that result from people following them. If a rule is justified, then an act is wrong if it does not conform to the rule.

In either case it should be clear that the simple utilitarian principle can be used to generate a set of moral norms or practices. In fact, many utilitarians propose that the utilitarian principle be used to determine what the laws of a society should be. Laws against stealing, killing, breaking contracts, certain business practices, etc. can be justified on utilitarian grounds. Utilitarianism is also often used as a principle for evaluating the laws that we have. If a law is not conducive to maximum possible happiness, then it is a bad law. Punishment, even capital punishment, is a good example of a social practice that can be evaluated in terms of its utility. According to utilitarians, since punishment involves the imposition of pain, if it does not produce some good

consequences, that is, if it does not prevent crimes from being committed, then it is not be justified.

Now, to return to the point about how utilitarianism captures part of the idea in relativism, it should be noted that the right action for act-utilitarians, at least, will depend on the details of the situation. In one situation it may be right to lie, in another it may be wrong. This is easy to understand for utilitarians. In some situations lying will produce very good consequences with only minor bad consequences; yet in other circumstances lying would be wrong because while it would produce some good, it would cause much more unhappiness than happiness. It is the same for other rules. To be sure, utilitarians assert a universal principle, "that everyone ought to do that which brings about the greatest happiness for the greatest number" but they recognize that this may mean quite different acts or quite different rules of behavior in different places at different times.

The fundamentals of utilitarianism have now been explained, and we should remember that we are engaged in a dialectic. We should critically examine the theory to see how it holds up to the test of scrutiny. We will do just that in a moment, but before we do so, utilitarianism has suggested several lines of thought that should be pursued further while they are fresh in our minds. For one, we see that utilitarians rest their moral theory on the good of maximizing happiness, but what is happiness? Furthermore, we see in utilitarianism a theory that bases right and wrong on maximizing something considered valuable. But, there are many other things that people seem to value besides happiness. Much more needs to be said about values, and their role in our lives. We must take up these questions as a prelude to our critical examination of utilitarianism.

Happiness

First, let us give utilitarianism a bit more of a hearing, by pursuing a little further what is meant by happiness. What is happiness? Jeremy Bentham, one of the first utilitarians, thought in terms of "pleasure" and "pain." He built his theory on the claim that people seek pleasure and avoid pain. He actually developed a kind of calculus that took into account a variety of characteristics of pleasures and pains and he used these for calculating the amount of pleasure and pain produced by various activities.

Later utilitarians, most notably John Stuart Mill, saw the inadequacies of this approach, and developed an approach that distinguishes pleasures by their quality, not just their quantity. Mill was concerned, among other things, to show that it was better to be a dissatisfied Socrates (a philosopher and

intellectual) than to be a satisfied pig. Indeed, it would seem that if we take happiness to be physical pleasure, utilitarianism begins to look like hedonism and humans look like they are no better than other animals. Yet, morality -- right and wrong, responsibility, obligations, etc. -- does not apply to animals. If we are "just" animals, why shouldn't we choose to stay high on drugs all the time, and commit our lives to avoiding pain and maximizing bodily pleasures?

Countering this idea, Mill recognized that humans have the capacity for kinds of pleasure that no other animals can experience. These qualitatively superior pleasures are tied to the human capacity for thought and reflection. Mill developed a method for distinguishing higher and lower pleasures. The higher pleasures are pleasures "of the mind." They include the pleasures of seeing a good play, listening to music, studying the great works of philosophy, etc. Thus, the utilitarian commitment to maximizing happiness entails (according to Mill) choosing higher pleasures over lower (more base) pleasures.

You may not find Mill's idea about higher and lower pleasures convincing (though it is worth more careful consideration than I have given it here), but the point is that whether or not we accept utilitarianism a good deal of attention needs to be paid to the idea of happiness or pleasure and its role in our lives.

Ultimate Good

While utilitarians claim that everyone seeks happiness, if one looks at the people around them, it often seems that different individuals put quite different weight on the importance of happiness in their lives. In fact, it is easy to think of examples of behavior that seem to contradict the utilitarian claim. Consider those who sacrifice their own happiness out of patriotism, for the sake of art, out of religious conviction, etc. Utilitarians might try to account for these examples by insisting that they are simple examples of how different things make different people happy. But if utilitarians say this, it would seem that they have significantly weakened their theory. We can insist that the important thing about people is not that they seek happiness but rather what makes them happy or satisfied. Both a murderer and a saint seek happiness, but there is all the moral difference in the world between them on account of what makes them happy.

Let us return to the very beginning of our discussion of utilitarianism where it was suggested that utilitarians look for some good, some value to ground a moral theory. Their idea that if we can find that which is of utmost value to humans, then we can understand right and wrong, good and bad, in terms of how they promote or diminish this ultimate good. This seems a worthy

approach, but we can still ask whether utilitarians were right to fix on happiness as the ultimate good for humans.

In fact, a distinction can be made between philosophies that fix on pleasure or happiness as the ultimate good -- these are often called "hedonistic" philosophies -- and those which put forth something else as a ultimate good. Non-hedonistic philosophers have fixed on such things as knowledge, virtue, aesthetic experience, freedom, self-expression as ultimate goods. Some hold only one of these to be the ultimate good, others are pluralistic in their accounts, holding that there are a number of things which are good in themselves.

We will not have time to explore these alternative approaches, but it is important to recognize the strategy of grounding a moral theory in one or several intrinsic goods. One's beliefs about right and wrong, good and bad will then be tied directly or indirectly to creating and maximizing this good.

The Good Life

The search for the ultimate good or goods can also be understood as a search for an answer to the ancient question, the question behind much ethical inquiry - what is the good life? The question asks both about what one should hold as valuable and about what one should "do." What would a good life consist of? wealth? don't friendship and love have a role? what about freedom? self-realization? One can examine one's own life and try to figure out what one values, or one can ask not so much, what do I value?; but rather, what should I hold valuable in order to have a good life? This question is of utmost importance because the answer one finds will determine what kind of person one becomes and what kind of life one leads.

Philosophers have, of course, been asking and trying to answer this question for ages, and one special twist on the answers that have been given is particularly significant. Some have suggested that instead of focusing on what people should desire and value, we should note the fact that all people desire and value. That is, they seek a good life and try to figure out how to get it. All people seem to go through life with ideas about what they want and with plans (even if ill-formed) about how to achieve what they want. Instead of trying to figure out what the plan should be for everybody, perhaps we should focus on the seeking and use this as the basis of our moral theory.

Here we might use a principle with respects each individual as a seeker and aims not to interfere with each individual's search for or creation of a good life. In a sense, this is the foundation of Kant's moral theory. In order to fully understand this theory, it will be best to return for a moment to utilitarianism and consider criticisms that are typically made of

it, for the virtues of Kantian theory are probably best illustrated by contrasting this theory with utilitarianism.

## Critique of Utilitarianism

One of the major problems with utilitarianism is that when it is applied to certain cases, it seems to go against some of our most strongly held moral notions. In particular it seems to justify imposing enormous burdens on some individuals for the sake of others. To be sure, utilitarianism claims that every person is to be counted equally. No one person's unhappiness or happiness is more important than another's. However, since utilitarians are concerned with overall happiness, we can imagine situations where great overall happiness might result from sacrificing the happiness of a few (or even their lives). Suppose, for example, that having a small number of slaves would create great happiness for large numbers of people. Those who were made slaves would be unhappy but this would be counterbalanced by marked increases in the happiness of many more, so much so that more happiness would exist than if no one was made a slave. Suppose, to use a more contemporary example, that by killing one person and using all their organs for transplantation, we would be able to save then lives. This would seem to maximize good.

In response to this attack, some utilitarians argue that such practices could never, in fact, be justified because of their long-term consequences. So, for example, a practice of slavery or of killing people for their organs could never be justified because such practices would lead to everyone living in fear that they might be the next one to be selected for sacrifice. The good produced, some utilitarians argue, could never counterbalance the bad effects of the fear. Other utilitarians seem to accept and defend the initial conclusions. They insist that in certain circumstances slavery would be justified or that taking organs from some to give them to others would be good; that is, they insist that in certain circumstances some people should be sacrificed for the sake of overall happiness. Let us further explore this criticism a little further and contrast it with a Kantian or deontological approach.

## Case Illustration

A few years ago, when medical researchers had just succeeded in developing the kidney dialysis machine, a few hospitals each acquired a limited number of these expensive machines. Hospitals soon found that the number of patients needing treatments on the machines far exceeded the number of machines they had available or could afford. Decisions had to be made as to who would get access to the machines, and these were often life-death decisions. In response, some hospitals set up review boards composed of representative community members as well as medical

staff to decide which patients would get access to the machines. Medical information was considered, but the decisions were made primarily on the basis of personal facts about the patients: age, job, number of dependents, social usefulness of job, whether they had a criminal record, etc. These committees appeared to be using utilitarian criteria. The resource - kidney machines - was scarce and they wanted to maximize the benefit to society (the consequences) of giving access to the machines. Thus, those who were most likely to contribute to society in the future would get access, e.g., those who had dependent children, those who were doctors, those who had the longest to live, those who were not criminals, etc.

Some philosophers were distressed with this, noting that one's value as a person cannot be measured by one's value to the community. These philosophers argued that everyone has value in and of themselves. The Kantian principle is that you should never treat another person merely as a means. One should always respect individuals as valuable in themselves. To treat another as a means to some end is the utmost in disrespect. It denies the value of the person. But, that is exactly what a policy of allocating scarce resources according to social value does. It says, in effect, that people have value only as means to the betterment of society.

In contrast, Kantians argued that the only way to truly recognize the equal value of persons is to distribute scarce medical resources by a lottery. In a lottery everyone has an equal chance. Everyone counts the same. Any other kind of distribution is unfair.

It is interesting to note that the kidney dialysis issue is just a microcosm of all medical resources. There is always less than is needed - of doctors, of money to be spent on equipment or research, etc. - and decisions have to be made about distribution. Distribution questions are precisely the kind of question that utilitarianism seems ill-equipped to deal with. The criticism of the review board for distributing access to the machines according to social value, goes right to the heart of this criticism of utilitarianism. Critics argue that people are valuable in themselves, not for their contribution to society. They argue that utilitarian programs are often unfair because in maximizing overall good, they impose an unfair burden on certain individuals, and as such treat those individuals merely as means.

We now need to look more closely at Kantian theory, but remember that whatever its weaknesses, utilitarianism goes a long way in providing a systematic account of many of our moral ideas. In the dialectic on ethics, it is a much better formulation than some of our raw intuitions about ethics. Still, the dialectic is not over.

## Deontological Theories

In utilitarianism, what makes an action right or wrong is something, so to speak, outside the action --its consequences. By contrast, deontological theories put the emphasis on the internal character of the act, not its effects. What makes an action right or wrong for deontologists is the principle inherent in the action. If an action is done from a sense of duty; that is, if the principle of the action can be universalized, then the action is right. For example, if I tell the truth (not just because it is convenient for me to do so, but) because I recognize that I must respect the other person, then I act from duty and my action is right. If I tell the truth because I fear getting caught or because I believe I will be rewarded for doing so, then my act is not morally worthy.

The difference between deontological theories and consequentialist theories was illustrated in the discussion of allocation of scarce medical resources. Deontologists say that all individuals are valuable in themselves, not because of their social value. As mentioned before, utilitarianism is criticized because it appears to tolerate sacrificing some people for the sake of others. With the emphasis on maximizing overall happiness, there are no absolute prohibitions on how we treat people in utilitarianism. By contrast, deontological theories assert that there are some actions which are always wrong, no matter what the consequences. The best example of this is the killing. Even though we can imagine situations in which intentionally killing one person may save the lives of many others, deontologists insist that killing would still be wrong. Killing is wrong (even in extreme situations) because it means using the person as a means and does not treat the human being as valuable in and of himself. Killing, at least intentional killing, is always wrong. [Deontologists do often recognize self-defense and other special circumstances as excusing killing, but these are cases when the killing is not exactly intentional.]

At the heart of deontological theory is the idea that individuals are of value and must be treated as such. This is based on an analysis or understanding of moral agency and what it means to be a person. Charles Fried, for example, puts the point as follows,

> ...the substantive contents of the norms of right and wrong express the value of persons, of respect for personality. What we may not do to each other, the things which are wrong, are precisely those forms of personal interaction which deny to our victim the status of a freely choosing, rationally valuing, specially efficacious person, the special status of moral personality. (Right and Wrong, p. 28-29).

According to deontologists, the utilitarians go wrong when they fix on happiness as the highest good. Deontologists point out that this cannot be the highest good for man because if this was what we were meant to achieve, we would have been better designed without minds. That is, if our function as human beings was simply to be happy, blind instinct would have suited us better. The fact that we are rational beings, capable of reasoning about what we want to do and then deciding and acting, suggests that our function must be something other than happiness. Humans differ from all other beings in the world insofar as we have this rational capacity. The behavior of other things is determined simply by laws of nature. Plants turn towards the sun by photosynthesis. They don't think and decide which way they will turn. Physical objects fall by the law of gravity. Water boils when it reaches a certain temperature. But, human beings, are not entirely determined by laws of nature. We have the capacity to legislate for ourselves. We decide how we will behave.

Our ultimate decision is how we will live and relate to others. Kant identifies a generic feature of human beings - our capacity for rational decision making. But the fact that each of us has this capacity, means that each of us can make choices, choices about what we will do, and what kind of persons we will become. No one else can make these choices for us.

For deontologists, then, the underlying function of human beings is not to be happy, but rather to be rational agents. Notice that it makes good sense that our rationality is connected with morality, for we could not be moral beings at all unless we had this rational capacity. We do not think of plants or fish or dogs and cats as moral beings precisely because they do not have the capacity to reason about their actions. So, the fact that we are moral beings comes from our rational capacity, our capacity to give ourselves rules and follow them. We are capable of determining our own behavior, in a way that other beings are not.

It may be helpful to remember our discussions of happiness and values here. Where utilitarians note that all humans seek happiness, deontologists seem to recognize some of the points we noted in our discussion of happiness. They emphasize that humans, using their capacity for thinking and deciding, are creatures with goals who engage in activities directed towards achieving these. In a sense, deontologists pull back from fixing on any particular value as structuring morality and instead ground morality in the idea that all individuals have the capacity for organizing his or her own life, for making choices, and engaging in activities to realize their self-chosen life plans. What morality requires is that we respect each of these beings as valuable in themselves and refrain from seeing them or valuing them only insofar as they fit into our own life plans.

Although deontological theories can be formulated in a number of ways, one formulation may be particularly useful here, a formulation already mentioned. This is a rule Kant referred to as the "categorical imperative" and the second version goes as follows: Never treat another human being as a means but always as an end. This general rule is derived from the idea that persons are moral beings because they are rational, efficacious beings. Because we each have the capacity to think and decide and act for ourselves, we should each be treated with respect, that is with recognition of this capacity.

It is important to note the "merely" in the categorical imperative. Deontologists do not insist that we never use another person, only that we never "merely" use them. For example, if I own a company and hire employees to work in my company, I might be thought of as using those employees as a means to my end (i.e., the success of my business). This, however, is not wrong <u>if</u> the employees agree to work for me and if I pay them a fair wage. I thereby respect their ability to choose for themselves and I respect the value of their labor. What would be wrong would be to take them as slaves and make them work for me, or to pay them so little that they must borrow from me and must remain always in my debt. This would be exploitation. This would show disregard for the value of each person as a "freely choosing, rationally valuing, specially efficacious person."

<u>Case Illustration</u>

Though utilitarianism and Kantianism were contrasted in the case illustration about allocation of scarce medical resources, another case will clarify things even more. Consider a case involving computers. Suppose a professor of sociology, at a major research university, undertakes research on attitudes towards sex and sexual behavior among high school students. Among other things, she interviews hundreds of high school students concerning their attitudes and behavior. She knows that the students will never give her information unless she guarantees them confidentiality, so before doing the interviews, she promises each student that no one but she will have access to the interview information and that all publishable results will be reported in statistical form. Thus, it would be impossible to identify the attitudes of any individual student.

Suppose, however, that it is now time to analyze the interview data and she realizes that it will be much easier to put the data into the computer and use the computer to do the analysis. On the one hand, she wonders if the data will be safe in the computer. She must make very careful security provisions. Furthermore, she has hired graduate students to assist her and she wonders whether she should let the graduate students handle the raw data. What should she do?

At first glance it would seem that from a consequentialist point of view the professor should weigh the good that will come from the research, and from doing it quickly (on the computer), against the possible harm to herself and her subjects if information is leaked. The research may provide important information to people working with youth and may help her career to prosper. Still, the advantage of doing it quickly is probably very slight. She must worry about the effect of a leak of information on one of the students. Also, (since she has explicitly promised confidentiality to the students-subjects) she has to worry about the effects on her credibility as a social researcher and on social science research in general, if she breaks her promise. That is, her subjects and many others may be reluctant in the future to trust her and other social scientists, if she breaks the promise.

Thus, it would seem from a consequentialist point of view that the professor should not violate her promise of confidentiality. Fortunately, there are ways for her to code data before it is given to her graduate students or put into the computer. She must, however, do the coding herself and keep the key to individual names strictly to herself.

This is how a consequentialist might analyze the situation. A deontologist would probably not come to a very different conclusion, but the reasoning would be quite different. The sociologist is doing a study which will advance human knowledge and, no doubt, further her career. There is nothing wrong with this as long as it does not violate the categorical imperative. The question here is, is she treating her subjects merely as means to knowledge and her own advancement, or is she truly recognizing those subjects as ends in themselves. The categorical imperative requires that the sociologist seek the permission of each subject before she gathers data on his or her sex life. In seeking the permission of each subject, she respects each as an individual who has his or her own desires, needs and plans, and the ability to make his or her own choices about what he or she will or will not do. If, however, the sociologist were to ignore her promise of confidentiality she would not be treating each subject as an end. After all, each student made a choice based on her pledge of confidentiality. She must acknowledge and respect that choice. Thus, out of respect for the subjects the sociologist must code the data and maintain confidentiality.

The two theories do not, then, come to very different conclusions in this case. However, the analysis is very different, that is, the reasons given for coming to a conclusion are very different. In other cases, these theories lead to dramatically different conclusions.

Discussion of utilitarianism and Kantian theory could go on indefinitely, but it is time to discuss two moral concepts which come up quite frequently in discussions of ethics, but which have hardly been mentioned here, namely "rights" and justice." When we examine these notions carefully, we find that they are far from simple, and that their meanings are tied to theories or, at least, to more systematic understandings of morality.

Rights

Generally rights are associated with deontological theories. Since the categorical imperative requires that each person be treated as an end in himself or herself, this seems to imply that individuals have "a right to" the kind of treatment that is implied in "being treated as an end." The whole idea that each individual must be respected as valuable in himself or herself implies that we each have rights not to be interfered with in certain ways, e.g., not to be killed or enslaved, and rights to freedom to make decisions about our own lives.

An important distinction that philosophers often make here is between negative rights and positive rights. Negative rights are rights which call for restraint by others. For example, my right not to be killed requires that others refrain from killing me. It does not require that others do something to or for me. On the other hand, positive rights imply that others have a duty to do something positive. Positive rights are much more controversial. For example, if we say that I have a positive right to life, this implies not just that others must refrain from killing me, but that they must do such things as feed me if I am starving, give me medical treatment if I am sick, swim out and save me if I am drowning, etc. Positive rights are controversial because they have implications that are counterintuitive. For example, if every person has a positive right to life, this seems to imply that each and everyone of us has a duty to do whatever is necessary to keep all people alive. this would seem to suggest that, among other things, it is our duty to give away any excess wealth that we have, to feed and care for those who are starving and in ill-health. It also seems to imply that we have a duty to supply extraordinary life-saving treatment for all those who are dying. In response to these implications, some philosophers have argued that individuals have only negative rights.

One case in which this distinction has become particularly important is that of euthanasia. New medical technologies make it possible for us to keep defective newborns and terminally ill patients alive for indefinitely long periods of time. Some argue that while it is wrong to do anything that will bring about the death of a patient (active euthanasia), it is not wrong to let a patient die (passive euthanasia). To do the former would be to violate the individual's right to life, but to let the patient

die is merely to "let nature take its course." People who take this position are claiming that the right to life is negative, not positive. Of course, this is a very tough and complicated issue, worthy of a much longer dialogue. It is used here merely to illustrate a philosophical analysis of rights.

While "rights talk" is usually associated with deontological theories, it is important to note that utilitarians may also use the language of rights, for one can argue for recognition of individuals rights on utilitarian grounds. For example, suppose we ask why individuals should be allowed to have private property in general and, in particular, why they should be allowed to own their own homes. Other forms of ownership are possible, e.g., communitarian. One way to argue for private property and home ownership is to argue that individuals take much better care of things when they own them. Thus, more good comes from allowing individuals to own things personally, especially their own homes. To argue this way is to argue for a right to property on utilitarian grounds. It is very different from arguing that one has a natural right to own what one has created, earned, or bought with one's earnings. Similarly, one can argue against allowing any form of euthanasia on grounds that the consequences of such a practice would open the door to all kinds of abuse, and ultimately do more harm than good. When one argues this way, one is, in effect making a utilitarian defense of the right not to be killed by euthanasia.

Since we will not spend much more time discussing the concept of rights, the most important thing to emphasize is that rights-claims are usually embedded in a theory. They should not be accepted as primitive truths. Rights-claims should be analyzed. Their underlying rationale should be uncovered and examined as illustrated above. Other examples that could be explored effectively in the classroom include claims about animal rights, claims about the right to medial care, claims about the right to work, etc.

"Rights talk" can be confusing because of the different kinds of rights that are often claimed--natural rights, moral rights, civil rights, legal rights, etc. However, if one looks for the underlying reasons for a claim about rights, one has a much better chance of figuring out what kind of right is being claimed, what the claim means, and, consequently, one will be in a much better position to evaluate the claim.

Justice

Different theories can also be used as the foundation for a theory of justice. What is just, according to utilitarianism, is what one is entitled to according to utilitarian principles. Thus, if we talk, as ethicists often do, about a "just" distribution of benefits and burdens in our society, for

utilitarians this means a distribution which will lead to the best consequences, the greatest amount of happiness. For deontologists justice is more closely tied to rights which people have in virtue of being rational beings. Justice is a matter of giving each person what is their due.

Macro and Micro Solutions

One final distinction will be helpful. There are several different levels at which an ethical issue may arise. For a start we might distinguish macro level problems from micro level problems, or individual choice from social policy questions. Macro level problems are problems which arise for groups of people, a community, a state, a country. They usually call for a solution in the form of a law or policy which specifies how all people in that society ought to behave. Micro level problems, on the other hand, are problems that arise for individuals--"Should I make a copy of this program?" "Should I lie to my friend?" "Should I work on a project making military weapons?" Sometimes these types of questions are answered by there being a rule established at the macro level, but other times the macro level rules are not there or are not adequate and individuals must make decisions for themselves about what they ought to do. The theories we have discussed apply to both types of questions, but is somewhat different ways so that it is important to be clear on which type of question you are asking or answering.

Environmental Ethics

Throughout this chapter we have encountered many moral notions and theories, and, where possible, they have been illustrated with examples that have to do with the impact of science and technology on our society. You might have noticed, however, that none of the theories explicitly put forth a philosophy of, say, "ethics in a science-based, technological world." None of the theories we discussed were grounded in STS. It is only in recent years that Philosophers have begun to make an effort to extend traditional moral concepts and theories to STS issues. One field in which some progress has been made is environmental ethics.

Environmental philosophers have begun to develop ethical theories which combine or extend traditional moral concepts with a holistic vision of the world in which humans are not opposed to nature but part of it. A good example of this is found in the work of Aldo Leopold. Leopold was quite concerned about the degradation of our environment which is taking place as a result of technological development. He saw this degradation as a moral issue and developed his reflections on the environment in moral terms. Leopold was very struck with the idea that the environment, the earth, is an extremely complex and interdependent system (an energy system) such tat if we make a

change in one place, we do not, and perhaps can not, know effects of that change somewhere else in the system. Yes, we can learn more and more about the interrelationships in nature, but we are bound to make mistakes. It is of critical importance, therefore, that we are conservative in the changes we make to our environment.

Leopold was particularly concerned about our destruction of animal species. Thus, e endeavored to extend our notion of rights to non-human beings. However, Leopold recognized that we could not simply take "rights" as we have traditionally understood them and apply them to animals. That is, we generally think of individuals (human individuals) as having rights, but Leopold did not argue that individual animals had rights. Rather he modified the notion of rights to apply to species. He writes of the biotic community and of species having rights within that community because of their role in it. Thus, he argues that non-human species have rights, rights which should stop us from making them extinct.

Leopold knew too well that we could not stop human interference in the biotic community, but he hoped to develop in us a moral way of thinking about the environment which would alter our vision of our place, alongside other beings, in that biotic community.

This is just one example of how moral concepts and theories might be extended to address STS issues. Much more thinking needs to go into this effort. Indeed, it will be up to the next generation, faced with many problems resulting from increased use of science and technology, to develop ideas conducive to a good life in such a world.

The ideas presented in the previous pages were entered into a dialogue and that dialogue is, by no means, over. It is not over for philosophers who specialize in providing answers to the questions of ethics. Nor is it over for our society or for any individuals. The reasons for there being no end to the dialogue are difficult to explain. Not only do new species of moral problems crop up all the time as a result of new technologies and other changes in the world, but there may be something in the nature of human knowledge that necessitates it. It may be that there is nothing new (or, at least very little new) under the sun. That is, it may be that all the truths are already written -- and rewritten, and rewritten. I wonder if human beings, both individually and as communities, generations, and civilizations, don't just remold, reformulate, and repackage moral truth. I wonder if coming to know isn't a process of reshaping, reorganizing in your own unique way, what is already there. Of course, to pursue this idea would take us on another long, dialectic journey.

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Working Papers in
*Science, Technology, Society*

**NATIONAL STS NETWORK**

# S T S

A Support Network for the Implementation
of Science, Technology and Society Education
in Junior and Senior High Schools

Working Paper 3

## SCHOOL - COMMUNITY RELATIONS FOR ETHICS AND VALUES IN STS EDUCATION

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# SCHOOL - COMMUNITY RELATIONS FOR ETHICS AND VALUES IN STS EDUCATION

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## INTRODUCTION

Science, Technology and Society (STS) education is an innovation designed to promote broad scientific and technological literacy, in order to empower citizens to take responsibility concerning the technologically charged issues dominating contemporary society. Examples of such "STS issues" include: environmental pollution, resource depletion, the threat of nuclear war, the release of genetically engineered organisms into the environment, the deterioration of work quality through workplace automation, and so on. STS education is an attempt to create a democratic citizenry with the scientific and technical understanding and political sophistication to deal responsibly with such issues.

STS education can be organized in terms of a "responsibility cycle," which may be repeated at each educational level (see Chapter One). The cycle begins with encouraging attitudes of personal and social responsibility, moves through issue study, decision making, and responsible action, and leads to placing each specific issue in the larger context of science and technology in society, including a standpoint on matters of values and ethics. Ethics and values are inherent in all STS problems, for technology itself is always value-laden. Any choice of technology involves the utilization of means for human goals and purposes, and every technological means has value trade-offs -- there are benefits and costs, some of which are unpredictable and even completely unexpected.

Consider some familiar examples: If we introduce a space based defense, perhaps we will have greater security -- but maybe the breakthrough will only escalate the arms race and end up making everyone less secure. If new workplace technologies make labor more productive, some skills which took years to develop will be rendered obsolete. If we push ahead with genetic engineering, perhaps new crops will be developed to alleviate hunger, but perhaps new organisms will be introduced into the environment

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with destructive effects. New technologies always promise benefits for some, while threatening others with new risks of harm. How shall our society regulate technology? How can we protect and promote the good of all? And who is to decide?

In recent years some social analysts have urged that technology has its own laws of development, which have overwhelmed the ability of people, whether citizens acting through democratic institutions or technical and managerial elites, to decide their fate. STS educators reject this "deterministic" position, arguing that the people can and should decide. However, along with their democratic faith they recognize the need for fundamental reform in educational goals and methods, associated with both knowledge and attitudes. As things stand, very few citizens can grasp the science or engineering involved in such issues as the strategic defense in space or the release of recombinant DNA organisms into the environment. Few have the political sophistication to deal effectively with such issues through democratic action. This leads to either ill-informed emotionalism or total withdrawal from decision making, leaving the fate of our society in the hands of technocratic experts. Either way, the general scientific and technological illiteracy leads to what Kenneth Prewitt (1983) has called a "crisis in our democracy."

STS seeks to resolve this crisis. STS educators make two related value commitments: to promoting an ethic of responsibility, and to encouraging broad participation in the resolution of technologically charged issues through democratic processes. STS educators seek to enlarge both the number and the sophistication of attentive citizens -- those who pay attention to and become concerned about the STS issues in society. STS is seen as increasing both scientific and technical understanding and what Prewitt has called science "savvy" -- understanding how scientific and technical issues play out in the managerial and political arenas, so that one cane be an effective actor within them. A person with this sort of "savvy" would, for example, be able to sort through e.g. the issue of cancer treatment as it is presented in both scientific and political contexts, e.g. in the debate over allocation of research funds.

## AREAS OF POTENTIAL COMMUNITY CONCERN

As STS education is implemented in local school districts, we may anticipate several possible concerns and sources of controversy in the community, including (1) controversial curriculum content, (2) the encouragement of student action, and (3) the quest for certainty in an uncertain world.

### Controversial Curriculum Content

First, specific content elements in the STS curriculum, taken out of context, may provoke controversy. STS units will

attempt to present a balance of views on controversial issues (criterion four). STS educators believe that an essential part of thinking for oneself is thinking along with, and assessing the viewpoints of, others who are leading the discussion on controversial issues. Thus, curriculum units will include statements representing opposing viewpoints. However, it is all too easy to tear an element out of a balanced curriculum and subject it to attack as though it stood on its own, as though the curriculum as a whole advocated one side of a controversial issue. All STS units will contain controversial position statements, and hence are vulnerable to this sort of unfair attack.

Encouraging Responsible Social Action

Second, decisions made by learners on STS problems will be truncated and ineffective unless they are carried forward in responsible action, so STS educators encourage the taking of action steps, frequently by way of association with organizations based in the community. In some cases, there is a broad consensus throughout the community on action steps needed. For example, many communities are now engaged in river cleanup projects supported by both environmental activist and industrial leaders. Successful STS efforts have been integrated with such projects in the Rouge, Chesapeke, and Schulkyl river basins. But many STS issues divide the community. For the schools to encourage responsible action as part of appropriate learning, a clear rationale must be created, and there must be much communication to promote understanding and support in the community. Teachers and administrators will need to develop clear guidelines for regulating relations between the schools and community-based organizations, such as environmental groups.

The Quest for Certainty

Third, STS issues raise all the anxieties of an uncertain world, where there is no "father who knows best." Some citizens will try to resolve their anxieties by seeking sense of certainty from scientific, technical, educational or religious authorities. But STS problems are complex and "ill-structured." There may sometimes not be any "right" answers, and even when there are, they are often very hard to come by. There will even be disagreements about methods for trying to find acceptable answers, and even about what the right question is. STS educators recognize that ordinary citizens in all walks of life must become increasingly capable of resolving such ill-structured problems for themselves, individually and as a polity.

In STS education, information and knowledge are severed from absolute certainty. There is no wise person in authority -- neither a scientist nor engineer in a white lab coat nor a benevolent religious nor political leader nor teacher -- who knows what is right or best. The responsibility shifts to the citizen

to think for him or herself. Indeed, the study of STS issues frequently brings out with unavoidable clarity how little is known about things which matter very much, to how unreliable, and even how untrustworthy, both scientific and political leaders may on occasion be. Consider the lessons from such recent examples as Three Mile Island, the Challenger, and the release of the "ice-minus" organism into the environment.

STS educators believe that the best solution to the problem of uncertainty is not to shield scientific and political leaders behind unrealistic images of competence and authority, however re-assuring such images might be in the short run. Instead, they seek to enhance the scientific and technical understanding and to build an inner experience of personal authority of the great mass of learners, so that they can -- with appropriate fear and trembling -- make their own decisions, based on their own best effort to think the issue through. STS is in a sense an attempt to include all possible sources of guidance and direction, and it can make this attempt precisely because it is inter-disciplinary.In the end their decisions will have to rest as much on the citizens integrity and willingness to accept responsibility as on objective evidence and rational decision procedures. This implies the thorough integration of the ethical dimension in the science and technology curriculum.

There clearly will be concerns, hesitations, even skepticism in the community regarding the content and methods fundamental to STS. Educators are advised to prepare carefully for the implementation process. In recent years some community members have been able to block other school reforms, focused on both content and instructional methods, designed to encourage learners to think through their own beliefs and convictions and make their own decisions, based on their own thoughts and experiences: open classrooms, inquiry methods, values and affective education, global education. STS educators have much to learn from these earlier problems and failures in the reform process. I have drawn heavily on a prior set of guidelines for coping with community controversy in social education (Foshay, 1974) in thinking through and formulating the principles and guidelines put forward here.

## THREE PRINCIPLES

There are three principles, grounded in the nature and traditions of public schools in our society, which can guide educators as they seek to implement STS in the local schools. I will call these the principles of community control, whole person development, and reason in controversy.

## The Principle of Community Control

Schools are under community control, and members of the community have the right to know in detail the goals, methods, and content of proposed innovations so that they can participate responsibly in the direction of education in the community.

Though the mandates of professional organizations and State Educational Departments in support of STS education are useful and necessary, they are not sufficient. The implementation of STS is under the direction and control of the local school districts. If STS is to be a vital element in the schools, educators must make a clear and compelling case for it within the community, anticipating and dealing with community concerns and reservations, and building support.

If they hope to build support, school districts must initially develop a base of local expertise on STS, and to build this capacity, several action steps are suggested.

First, school administrators, and teachers involved in STS, will need to become fully informed about the rationale, goals, methods and content of STS education. This means that school leaders must attain mastery of the supporting statements of the professional organizations such as the NSTA and NABT, and the goals and objectives put forward in their own and other states. They must be fully informed about the efforts of national curriculum projects such as BSCS and S-STS, as well as commercially published materials and those produced under the sponsorship of industry and various interest groups. The most important research studies which support the innovation should also be studied and understood, and interpreted for the public.

Second, although STS shares with inquiry, values, and affective education an important "process" dimension, it must be solidly grounded in scientific and technical understanding. For this reason it is suggested that participating teachers acquire and demonstrate considerable expertise on selected STS issues, in order for the program to be presented concretely, and in a convincing way, to the public.

A recommended approach to capacity building is the formation of interdisciplinary "STS Teams" within the district, selected from various grade levels, and from among science, social studies, vocational-technical and language arts teachers. These teams would have the responsibility, under the supervision of administrative leaders, for the implementation of STS in the local district, including the selection of content, the sequencing of units of instruction, the peer-training of teaching personnel, and policies for assessment of learning. Team members would have the responsibility for becoming experts in STS education, and for briefing administrative leaders. This

expertise will make the teachers valuable resources as the school district communicates with community members and leaders.

To enhance their knowledge base regarding STS content, team members should be encouraged to form study groups to investigate STS issues. Membership in the group could also be extended to members of community-based organizations concerned with these issues (e.g. environmental groups, labor organizations, church groups). They may be peer facilitated, or led by university-based personnel. The groups may be willing to work "the old-fashioned way," taking time out of their personal time and bearing their own expenses. Or they may acquire teacher stipends, release time, and university credit hours through state or federal government agency funds or partnerships with local industry.

When there is the appropriate depth of STS knowledge available, district leaders and teachers must then be willing to use it effectively in their communications with community members. No element of the program should be kept from the community to avoid possible concerns or reactions, or on the grounds that "we know better." Expertise concerning educational matters should never be used as a shield to guard against the concerns and doubts within the community. Such tactics only push the concerned many towards the anti-democratic few, creating a barrier to implementation. The STS educator, who seeks to encourage responsible participation throughout the community, must begin with a commitment to keep his own house clean -- free from emotional slogans about alleged benefits, obfuscating educational jargon, and selective sharing of relevant research data.

## The Principle of Whole Person Development

Schools share with other institutions the responsibility for the development of the "whole person," as an individual and a member of society, and have a special responsibility for the cognitive dimension.

Educators have to chart a middle course between asserting a radical monopoly over all learning on the one hand, and retreating to an ivory tower academicism on the other. The schools share with other institutions of society the responsibility for the development of the "whole person," as both an individual and member of society. In a general way, we can divide the traditional and appropriate goals of schooling into four "goal clusters," (1) personal, (2) academic, (3) vocational, and (4) social. Responsibility for personal (moral and psychological) development is shared with family, churches, youth organizations (e.g. scouts), the health professions, etc. Responsibility for the transmission of knowledge and information is shared with cultural institutions and the communications media. Responsibility for social and political education is shared with political organizations and leaders, labor

organizations, and community-based groups (e.g. environmental groups).

The schools may neither neglect nor hog any of these responsibilities. They cannot successfully avoid dealing with technologically charged issues which will impact the lives of their students, by declaring that it is "none of their affair." That is the "Nero principle," fiddling while the world drowns in environmental pollutants, explodes in a nuclear cloud, or declines into an automated concentration camp while the citizenry remains ignorant and incapable of action. On the other hand, they cannot strip other institutions (e.g. churches, youth groups, community groups, environmental groups) of their legitimate roles in nurturing learning in the young. Instead, each local district must think through and bring into practice its proper roles in all these areas and establish its appropriate co-operative relations with other social institutions.

The "philosophy of education" and "purposes and goals" statements of every local school district acknowledges this. The implementation of STS does not entail extending the philosophy and purposes of the schools, but may involve much soul searching about the current implications of statements already accepted in principle and on the books.

The public school, however, does have two special roles: it bears a primary responsibility for cognitive growth, for guiding the development of each learner's powers of thinking and reasoning and bringing these to fruition in both academic learning and the other dimensions of life: personal, vocational, social. Our liberal arts and progressive traditions provide relevant guidance for the school's fulfillment of this function. But to fulfill it effectively school leaders and teachers require and demand basic academic freedom. The community must not restrict the learner's access to information, or forms of thinking. No legitimate methods of inquiry are off limits, including e.g. chemical testing of soil and water for environmental pollution, interviews and community surveys which may reveal widespread ignorance and apathy and upset, or deep divisions in the community.

And the public school has a very major responsibility for inclucating the values, attitudes and skills of democratic participation in the decision-making processes of our society (Gutmann, 1987).

As already noted, there will always be some members of the community who will reject the idea that young people should be educated to have minds of their own with respect to matters of fact and political judgment. They feel that young people should be told what to believe and do, and will instinctively react against all democratic tendencies in public education. In the

face of their challenges, educators must protect basic academic freedom; to do otherwise would, as Foshay notes, "destroy the integrity of education and threaten the very existence of our free institutions (p.5)." In communities divided over school practices, this is never easy. But the burden can be reduced greatly by careful preparation, and the guidelines presented below should be useful in guiding that process.

The Principle of Reason in Controversy

With regard to community controversy, it is the primary role of the schools to bring thinking and reasoning to bear on the issues. Schools do not exist to provoke controversy in the community, but must not hide from it either.

Education is not indoctrination, and schools must be careful to avoid the perception that they are antagonists taking sides on issues which divide the community. STS educators reject curriculum units which present only one side, which fail to present a balance of opposing points of view on technologically charged issues. The STS educator may personally favor solar over nuclear power, a lower fat diet than the one advocated by the dairy industry, a tight restriction on new technologies of human reproduction. But mere advocacy of such positions, however scientifically grounded they may appear to be, is not appropriate in the public schools, and is simply not STS education (see criterion four).

This does not mean that STS is "value-neutral," and it most definitely is not. It is grounded in two basic value postulates: an ethic of personal and social responsibility, and the encouragement of broad participation in the democratic decision making process. Effective STS education conveys these values to learners, forcefully prevailing upon them to feel that "they are the world," that one of the deepest sources of meaning in their own lives is to protect the environment and the quality of living by their own lifestyle choices and informed participation in collective decisions.

But these value-commitments are actualized through educational activities, so they must be integrated with the primary commitment to the full development of powers of thinking and reasoning. When controversy develops in the community over technologically charged issues, and spills over into the schools, the schools have a unique opportunity to steer a course between advocacy and avoidance. STS educators can seize the opportunities presented by controversy. Before young people become enmeshed in the fray, merely acting out their conflicting viewpoints, they can first be encouraged to investigate the issue, including these conflicting positions. Are the positions stated clearly, or in emotional slogans? Are the various claims made by each side well grounded, or based on inadequate evidence? Are the sides playing

fair, or using tactics which should be rejected by a democratic public?

But the schools will not succeed in reducing community controversy to mere academic content, e.g. to make the battle over the nuclear munitions plant in town as sterile as "Egypt lessons." And they should not try. Instead, once a decent climate for study has been established, investigations should proceed toward decision points. What is the real problem? What are possible solutions? What can be done? And then, in conjunction with the various community groups involved, young people should be encouraged to act, to become "part of the solution." As Ernest Boyer has been saying recently, our students are not our "future citizens," but rather our "young citizens."

## GUIDELINES

So far we have noted that schools are subject to local control and STS must be implemented by local personnel. The schools share the responsibility for the full development of the young, and have a special responsibility for full cognitive, social and political development, and hence must protect basic academic freedom. They are not antagonists in community controversy, but instead of running from it, they have the opportunity to use it to help develop the thinking powers of learners. These principles, growing out of our educational traditions, help us formulate guidelines to mark the trail along which STS education may be implemented in the schools.

### Before Getting Started

(1) Know the community.

The first preventive measure in educational reform is to know the community. By doing so, district personnel can understand what matters to different groups, and so what educational efforts will be regarded as valuable, threatening, etc. This provides valuable insight to shape the reform process (e.g. selection of issues for investigation), as well as an early warning signal for potential problems regarding the reform.

For STS in particular, knowing the community means both establishing relations and maintaining communications with leaders and opinion shapers throughout the community, and knowing about the technologically charged issues which are affecting community life.

STS-identified faculty members (in the best case, members of an administration - appointed interdisciplinary "STS team") should think of themselves as a committed and forward-seeing group, willing to go the extra mile by working across disciplinary boundaries and extending out into the community.

They can "know the community" by building links, either as members or as interested school personnel, with influential community organizations. Then, throughout the implementation process, those most directly involved in the school district will know or be able rapidly to find out the concerns of opinion shapers. In this way they can avoid the accidental triggering of community opposition. And if concerns are felt, prior relationships create opportunities for a fair and reasonable process of resolution, before positions are staked out and emotions are running high.

In the best of worlds, the STS faculty will also participate in an STS study group, and a central concern of the group should be the study of technologically charged issues in the local community, e.g. water quality, plant automation involving lay-offs and retraining, land use policy, etc. Members of such a study group are an invaluable resource for the district. By their ability to discuss community issues in an informed and responsible manner, they are a "walking argument" for STS education.

(2) Study local policies for, and case histories of, the handling new or controversial materials.

As mentioned earlier, every local school district from time to time experiences opposition to new curricula promoting learners "thinking for themselves." There will be many more community members, possibly a majority, who will have legitimate concerns, and if these are not handled well, the new program may be defeated. Each district will have a history regarding opposition to its programs, and should have policy guidelines for academic freedom and censorship, including the handling of controversial instructional methods and materials.

For reasons already discussed, STS education may be expected to arouse concerns and possible opposition. STS educators should anticipate this possibility, and familiarize themselves with both written policy guidelines and case histories. If no written policies exist, STS educators should take the lead in developing them as a necessary preliminary to STS implementation.

Four action steps are suggested. (1) Search out and study existing policy guidelines; (2) explore implications specific to STS; (3) within the STS program, develop clear guidelines for the adoption and utilization of instructional materials and the selection of STS topics, and (4) develop specific guidelines regulating the relationship between the academic program of the school and the activities of community-based organizations.

In developing such guidelines, the S-STS taskforce definition of STS education, the STS curriculum framework developed by the Social Science Education Consortium, position statements of professional teachers organizations, and the mandates of the State's Department of Education should play a central role, and provide authoritative external support for local program efforts.

## Introducing the STS Program

(3) Involve the community early.

Schools are under local community control, and members of the community have every right to be informed about, and involved in, the implementation of STS (principle one).

Early in the implementation process, the district should begin to dialogue with the community. Various forms are appropriate in local circumstances, such as brown bag lunches with administrators and community leaders, and well publicized meetings open to the general public. These meetings should be dialogues, not just one-way communications to "inform the public." Topics should include the basic rationale and goals of STS education, its relation to the philosophy and goals of the district, its support from national professional organizations and where applicable the mandates of the State Education Department. A sample lesson may be presented as a clear example of the kinds of methods and content to expect in STS. Instructional materials being considered for adoption should be displayed and explained. When early support has been obtained through one-on-one communications, leaders of parent organizations, local industry and labor unions, 4-H, Scouts, and other community-based organizations, may usefully be involved at such meetings.

The meetings should include opportunities for comment and the expression of concerns and even criticisms, however premature or ill-informed. Exaggerated claims for the value or benefits of STS should be avoided; instead of re-assuring potential doubters, they will almost certainly trigger opposition. Instead, research data and anecdotal reports from other districts should be presented, which point in a sober fashion to both benefits and potential pitfalls. The rule of the day should be "Keep it Simple." STS should not be presented as a a magical solution to educational problems, but rather a potentially useful means, consistent with the district educational philosophy, for "keeping up to date with our rapidly changing technological society."

(4) Try to anticipate areas of controversy.

As indicated, STS is vulnerable to attack on grounds of both content and method. By dealing with controversial issues and studying controversial positions, STS is itself immediately controversial. By encouraging learners to think for themselves and to act, however responsibly, in the community, STS may be expected to arouse the concerns of many and the active opposition of the anti-democratic few.

The areas of potential controversy are not hard to identify. Indeed, the first line of opposition may be the teachers themselves, who appreciate the hard work involved, readily identify potential danger zones, see the entire innovation as nothing but a can of worms and seek to avoid it. This sort of thinking is reactive, and can be countered with clear explanations of goals and objectives, good model lessons and instructional materials.

With members of the community, the best approach includes building good community relations and communicating clearly about the proposed innovation (guidelines one and three), followed-up with an open attitude, a willingness to listen to concerns and take them seriously, and assurances that instruction will be orderly, effective, and balanced -- not biased against their positions or values. Later guidelines will focus on further steps if these prove inadequate.

(5) Prepare to turn community issues into worthwhile community learning.

The school is not an antagonist, taking sides, provoking controversy and deepening community divisions (principle three). When emotions run so high on a particular issue that any attention to it, no matter how benign, only inflames passions, the schools may be advised to select less controversial issues in STS. However there are frequent opportunities to turn existing controversy into opportunities for community learning.

The Kettering Foundation sponsors a program of "National Issues Forums," using a town meeting format to present various points of view and involve citizens in decision-making. Some local communities have adapted this kind of format to local issues, preparing print materials and videotapes, presenting the basic scientific and technical information and position statements of the competing parties. The school districts can take a lead in sponsoring local STS issue forums, with STS teachers playing key roles in organizing and presenting basic knowledge and information, choosing speakers and assisting them with their presentations, and facilitating reasoned discussion in preparation for community decision-making (e.g. voting on a referendum). The preparation for such forums can focus STS

learning activities in school classrooms, and act as a bridge between students and members of the community, while the forum format can also organize STS units intended specifically for school students. STS Issues Forums can be of direct benefit to the community, and effectively demonstrate the value of STS education.

(6) Start with pilot and demonstration programs, before expanding throughout the district.

There is natural resistance to "reinventing the wheel." Nonetheless, STS education must be implemented at the local level by local teachers, consistent with local traditions and expectations (principle one), and that means that it must be "re-invented" wherever it is implemented. If teachers are given STS materials developed elsewhere and merely told to use them, the reform will be shallow at best. Teachers must invest themselves in the materials, and adapt or modify them to take advantage of their own knowledge and favored styles of teaching, based on their intimate knowledge of local circumstances.

This argues for a step-wise process of implementation. Start by identifying teachers who are already informed and ready to give STS a try. Provide them with training, and connect them to sources of information and support beyond the district. Make these pilot efforts genuine experiments, gathering quantitative and qualitative data about activities and results in order to assess the value of STS. At a later stage, these pilot projects may be judged successful, and transformed from experiments into demonstration projects. Strengths and potential pitfalls can then be communicated with other teachers in the district, who perceiving the opportunities may become willing if not eager to adopt STS in their classrooms. A balanced presentation of a local success story (especially one in which everyone in the community was included from the beginning), will mean more to both local teachers and community members than any national models or data.

(7) When using nationally distributed, commercially published or industrially sponsored materials, establish links with the source organizations and consult with them regarding utilization and modification.

When the STS idea is presented to the community, it is important to emphasize that STS units always provide a balance of opposing points of view. Nonetheless, it is all too easy for an angry citizen to tear an element out of its curriculum context and assault it. It would hardly to appropriate to present an STS unit on biotechnology and fail to include position statements from such anti-bio-technology activists as Jeremy Rifkin. But that makes it possible for someone to make the attack that "you are teaching Rifkin in our schools."

While a panic and rage-laden defense by a harried teacher may be ineffective, authoritative statements about the role of the controversial content within a balanced presentation of a topic, from the curriculum's source organization, may be more reassuring. Instead of reacting defensively, district personnel can listen to the concern, attempt to resolve the issue through reasoned dialogue, and promise to "look into it further" if this fails, following up by sharing information from the source organization. A similar tactic may be employed when some community members demand that particular elements, needed for a balanced presentation, be removed. Statements from the source organization about the necessity of those components for instructional balance and effectiveness may help to ward off, or gain support in, a battle over academic freedom.

(8) Explore factors which may aid assist or block implementation.

The key elements which aid implementation include: (i) identification of key district personnel and establishment of working groups or "teams, " (ii) early support-building in the community, (iii) local trials and demonstrations, (iv) a plan for in-service staff development, including goals, instructional strategies, and teaching materials, (v) clear communication to teachers of professional association positions and supporting documents, (vi) research data about effectiveness in comparable districts, (vii) mandates and directives from State Departments of Education.

Key elements which will create barriers to implementation include: (i) inadequate dialogue with the community, (ii) wild and unsubstantiated claims of miraculous instructional effectiveness which only trigger skepticism and oppositional reactions, (iii) isolating STS from the rest of the curriculum, which makes it prone to early amputation. Instead, the STS emphasis should be integrated throughout the curriculum, and presented to the community as something worth building into the curriculum to better promote established goals.

## Responding to Attack

(9) Listen carefully for the concerns behind any attack, and seek to clarify and respond to the concerns rather than reacting to attack.

In STS and other democratic school reforms, the community may be divided into the enthusiastic few, the apathetic many, the potentially concerned and doubtful many, and the anti-democratic few. Districts have from time to time made the error of shielding themselves behind authority and obfuscating jargon, and failing to respond appropriately to legitimate concerns, doubts, fears,

and hesitations. They have failed to pay heed to guidelines about knowing the community and involving it early in the reform process. These lapses provide anti-democratic groups with their constituencies. Once that happens, there is a further error which must be avoided: confusing the concerned and upset citizen with the fanatic.

District personnel should start by expressing gratitude to citizens for their concern, letting upset attackers know that they prefer concern to apathy. Frequently the concern will be based on mis-information, and can be effectively countered with correct information. "I understand your concern about 'teaching Rifkin.' You are right to be concerned about the possibility of bias. Actually, STS involves the presentation of a balance of opposing points of view, and his is merely one of several conflicting views which the students are investigating."

If the concern is about student action (e.g. an environmental activity involving such groups as Greenpeace), again teachers and district leaders should start with an expression of appreciation for the concern, and follow this with a review of guidelines for cooperative relations with community-based organizations. Assurances should be provided that organizations viewed more favorably by the attacker are also encouraged to become involved in the district's STS effort, in accord with the same guidelines.

Some attacks may appear to be directed at STS, but listening carefully may help direct the concern to a different target. Perhaps a teacher has been advocating a particular position, or handling opposing viewpoints in an inappropriate manner. Perhaps the issues investigation and decision-making activities have been too unstructured, with no science and technology learning taking place. Here the problems lie not with STS education, but with teacher behavior which can be explored and corrected. Perhaps STS activities are perceived to be taking too much time away from science content instruction, threatening to lower scores on achievement tests. Here the teacher and district leaders can appeal to local and professional association guidelines, and provide research results which indicate that within these guidelines STS does not detract from content learning.

(10) Don't convert STS into an oppositional position or educational ideology.

The developers and early adopters of STS, like those of open classrooms, inquiry methods, values clarification or global education, invest themselves deeply in the reform. Their high energy levels and emotional commitment are needed to fuel the early stages of the reform process. To sharpen their focus, they may tend to draw sharp lines and even polar oppositions between STS and the rest of the curriculum. This may lead to definition

of curriculum issues in black and white terms. For some educators STS may become an educational ideology, a "reason for being." As with such earlier reforms as alternative programs and affective education, some STS advocates may become "true believers."

The STS movement will inevitably be of two minds about such individuals. Without their dedication and commitment, the movement could not even get started. But there are obvious pitfalls as well. True believers are more likely to over-accentuate the positive and hence create opposition, distance themselves from community doubts and hesitations, react defensively when attacked. STS teachers should be encouraged in their deep commitment. They are, after all, shouldering responsibility for the future of our environment and quality of living. But they should also understand that "he who wills the end wills the means." In educational reform the means are tolerance, openness, inclusiveness, taking concerns seriously. Thus teachers should avoid all tendencies which conflict with these means. Especially, they should not be encouraged to find professional "salvation" through STS, but to retain balance and perspective. Then STS can be seen to be the best educational means currently available and consistent with our established educational traditions for contending with the important scientific and technological challenges facing humanity.

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# S T S

A Support Network for the Implementation
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in Junior and Senior High Schools

Working Paper 4

## USING DISCUSSION TO EXPLORE VALUES AND DEVELOP POSITIONS ON STS ISSUES

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# USING DISCUSSION TO EXPLORE VALUES AND DEVELOP POSITIONS ON STS ISSUES

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## Introduction

The purpose of this paper is to assist teachers in leading productive classroom discussions on STS issues. The purpose of the discussion technique is to help students to develop clear and defensible positions on these important issues. At the heart of STS education is the belief that human beings should exercise control over the nature and uses of science and technology so that it serves, not harms, humankind and the environment. The way this occurs is through the exercise of public control, most often through differing forms of legislation or collective action. This process requires collective decision making in the articulation of these policies. It is the practice of this collective decision making that ideally occurs in classroom discussions. As a result, classroom discussion is at the heart of citizenship education. Look at the brief excerpt from a class discussion on nuclear power in Ms. Jones's class:

Ms. Jones: Well, you've all read the editorial from this morning's Chronicle supporting the referendum to close down the Salt Flats nuclear power plant. What do you think?

Sue: Chernybol, that's all that needs to be said.

Bill: You're nuts. Just because the Russians can't run a safe plant doesn't mean we can't.

John: Yeah. We've never has an accident and never will.

Sue: What about Three Mile Island?

John: What about it?

Sue: You said we've never had an accident.

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John: I meant one that caused any harm to anyone.

Sue: Three Mile hurt someone.

John: Who?

Gerry: You guys have missed the point. THe major issue here isn't safety, it's jobs.

Sue: You mean jobs are more important than the safety of the community?

Gerry: Darn right! There's no such thing as a safe job - all jobs have some risk. The choice is jobs or no jobs.

Tom: No it isn't. The question is dependency on foreign oil. If we close down all our nuclear plants, then we're at the whim of Bozos like the Ayatolla and Quadaffi and their oil.

Ralph: The most important question is nuclear waste. What do we do with it? I saw a report the other day that said there is no safe way to dispose of it. If so, it seems to me the solution is obvious -- close the plant down.

John: I'm getting confused. We all need energy. Coal leads to pollution and acid rain. Nuclear energy is dangerous and oil makes us dependent on foreign countries and leads to oil spills like the Valdez. What are we supposed to do -- run the country on hamsters in cages.

Sue: You guys are really dumb, really dumb.

Ms. Jones: Now now. Name calling won't settle anything. It's about time for the bell. Don't forget we'll have a quiz tomorrow.

The above discussion is, unfortunately, typical of what passes for discussion in many classrooms. The major weaknesses of the discussion, and I'm sure you can identify some others, were the failure to pursue ideas with continuity and failure to carefully examine the content of individual's statements. The end result is a discussion that jumps from perspective to perspective and fails to move the group to a clearer and more defensible perspective. Students come away from such discussion with little more than an awareness that others have different

opinions. Students seldom listen to or respond directly to others positions. The result is a sense of randomness and frustration on the part of students. Teachers frequently feel, along with students, that they are pretty much a waste of time.

Things do not have to be this way. Other teachers, unlike Ms. Jones, take an active part in the discussion, make sure students listen to and respond to each other's perspectives, and use the discussion process to assist students in the development of reasoned and defensible positions. It is the purpose of this handbook to provide some of the understanding and techniques that will permit you to lead discussions that you and your students find helpful in analyzing STS issues.

While classroom discussion may look like the one presented above, it has been the experience of teachers trained in classroom discussion that the increased involvement of students, the high level of interest and the chance to express oneself on important questions, represent high points for all. The simple fact is that students enjoy a good discussion on an interesting topic and good discussions lead to increased student involvement, interest, and positive attitudes toward the subject and the class.

The approach presented below is a simplified amalgam of four earlier approaches to the discussion of issues. These approaches are the Public Issues Approach of Oliver and Shaver (1966), the Rationale Building Approach of Shaver and Strong (1976), the moral dilemma discussion approach of Lawrence Kohlberg (Arbuthnot and Faust, 1981) and the Reasoning with Democratic Values approach of Lockwood and Harris (1985).

## THE INFRASTRUCTURE OF REASONED POSITIONS ON STS ISSUES

The purpose of this section is to present an analytic framework for understanding the nature of clear and defensible positions on STS issues. In the following section on leading discussions this framework will be integrated with teaching skills.

At the heart of the study of the relationship between science-technology-society are issues. Issues are questions regarding the proper relationship between science-technology-society about which people are uncertain or disagree. One such list of the types of STS issues facing the world today, from a ranking of global problems by 77 science educators, is listed below (Hickman, Patrick & Bybee, 1987).

## STS ISSUES

**Population Growth**

(world population, immigration, carrying capacity, foresight capability)

**Water Resources**

(waste disposal, estuaries, supply, distribution, ground water contamination, fertilizer contamination)

**World Hunger and Food Resources**

(food production, agriculture, cropland conservation)

**Air Quality and Atmosphere**

(acid rain, $CO_2$, depletion of ozone, global warming)

**War Technology**
(never gas, nuclear developments, nuclear arms threat)

**Energy Shortages**

(synthetic fuels, solar power, fossil fuels, conservation, oil production)

**Land Use**

(soil erosion, reclamation, urban development wildlife habitat loss, deforestation, desertification, salinization)

**Human Health and Disease**

(infectious and noninfectious disease, stress, noise, diet and nutrition, exercise, mental health)

**Hazardous Substances**

(waste dumps, toxic chemicals, lead paints)

**Extinction of Plants and Animals**

(reducing genetic diversity, wildlife protection)

**Nuclear Reactors**

(Nuclear waste management, breeder reactors, cost of construction, safety, terrorism)

**Mineral Resources**

(nonfuel minerals, metallic and nonmetallic minerals, mining, technology, low-grade deposits, recycling reuse)

While these are global issues, there is a counterpart at state, city or local community level's which will engage student interest. What makes these issues of such educational importance is that they all have important ramifications for our quality of life and our future on this planet. Even though reasonable people may disagree on these issues good citizens will reach their own decisions and act in some way. Citizen action may simply involve voting every four years for a president that represents your viewpoint or it may involve direct citizen action such as setting on railroad tracks to stop the transportation of plutonium to a nuclear plant. The concern addressed in this paper is the formulation of one's position on the issue, not what the proper form of citizen action should be.

This approach is compatible with other important conceptualizations of the purposes of STS education. For example, the 1985 national task force on STS education that met at Penn State University established eight criteria as essential to STS lessons, units, and curriculum materials (Waks, 1988). Of the eight criteria, four have special relevance to this approach: relation to social issues, balance of viewpoints, decision making and problem solving, and responsible action. Waks' discussion of responsibility in STS education presents in clear terms that thought full deliberation and responsible action are essential components of effective STS education (Waks, 1988). Both Waks (1988) and Johnson (1988) present analyses of the place of values and ethics in STS that the reader should refer to for a deeper understanding of these important source of information on alternative, but compatible, ways of addressing the values and ethics component in STS education.

It is assumed that most students, when presented with an STS issue, will have an initial or provisional response regarding how the issue should be resolved. This provisional position will emerge early in the discussion. The goal of classroom discussion is to provide the opportunity for students to transform their provisional position into a reasoned position. A fully reasoned position on an STS issue has three characteristics. First, it is clear; that is, the student is aware of the logical components of

his/her argument, questions of fact, definition and value. Second, the student's argument is defensible; that is, he/she is able to convincingly warrant the assertions of fact, definition and value. Finally, the position taken is qualified; that is, the student's position is formulated in such a way that it can consider and accommodate the arguments of competing points of view.

It is commonly accepted that values lie at the heart of individual's decisions and actions in life. Values have been defined in the psychological and philosophical literature in a variety of ways. A short list of some of the definitions of values is listed below.

VALUES ARE:

- any object of any need
- the desirable end states which act as a guide to human behavior, or the most general statements of legitimate ends which guide action
- normative standards by which human beings are influenced in their choice among the alternative courses of action which they perceive
- anything desired or chosen by someone; operationally, what the person says he wants
- the object, quality or condition that satisfies ones motivations
- anything that peoples' actions indicate they are attracted to
- anything being appreciated (wished for)
- our standards and principles for judging worth; they are criteria by which we judge things to be good, worthwhile, desirable or on the other hand, bad, worthless, despicable

For the purpose of this approach to classroom discussion the typology presented by Rokeach (1970) that discusses the relationship between beliefs, attitudes and values is adopted. According to Rokeach:

**Beliefs** are defined as convictions about the truth of particular ideas/ inferences about underlying states of expectancy: descriptive (sun rises in the East), evaluative (Ice cream is good), and prescriptive (children should obey parents)

**Attitudes** are an enduring organization of beliefs around an object or situation predisposing one to respond in some preferential manner -- an internal state which affects an individuals choice toward some objective, person or event

**A Value** is an imperative to action, not only a belief about the preferable, but a preference for the preferable -- a standard or yardstick to guide actions -- a justification for the actions of self and others -- a combination of attitudes which generate action.

There are three types of values:

1. esthetic values - judge beauty
2. instrumental values - standards set in order to achieve other values
3. moral values - used to judge whether aims or actions are proper

Underlying any position on a STS issue will be a value. The awareness of and ability to defend ones values is central to the process. It is the assumption of this approach that in most cases students will initially hold to a position without an awareness of their values. That is, values exist in the mind independent of self awareness or public affirmation. The first step therefore for the teacher in the classroom is what Shaver and Strong call **Value Identification** - becoming aware that values are at work. Simply awareness, by itself, however, is superficial. Values, like other components of the decision making process must be defensible. The second step for teachers is to get students to defend their values. This step can be called **Value Justification**. There are two ways students can justify their values. One way students can defend a value is by placing it within a more general legal -- moral framework that is widely accepted. Examples of this might be the Judeo-Christian value framework, the American Creed (see below), or Laswell's Universal Values (see below). A second way that values can be defended is by predicting a valued consequence (eg, well being, health) will follow if the value is acted upon.

One list of values frequently used to defend ones own values is the American Creed (Myrdal, 1962). The American Creed is a set of values phrased in general, abstract language to which most Americans would proclaim allegiance and commitment:

- the worth and dignity of the individual
- equality
- inalienable rights to life, liberty, and the pursuit of happiness
- consent of the governed
- majority rule
- rule of law
- due process of law
- community and national welfare
- rights to freedom of speech, press, religion, assembly, and private association

Other frequently cited American values include:

- honesty/truth
- responsibility
- promise keeping
- loyalty
- charity
- property
- liberty
- life
- authority

Yet another list that has received considerable attention is found in the work of Harold Laswell (1952). Laswell presents a framework of universal values prized in all cultures or groups. According to Laswell, the needs and wants of an individual or a group, when determined to be desirable, or of relative worth, or of importance, become values. Laswell believes that these eight universal values permeate the lives of all peoples, are found in all places, and have been prevalent at all times. The truly unique feature of the framework is that virtually all needs and wants of human beings can be classified under these eight value categories:

**Respect** refers to the degree of recognition given to, or the degree of discrimination against people in their capacity as human beings; it includes concern for authority, country, peers, adults, and self.

**Wealth** is the ability to provide for one's need adequately; to develop talents that increase one's productivity to appreciate and care for material objects with which one comes into contact.

**Power** refers to participation indecision-making that affects self and group values; it refers to development of leadership and fellowship talents.

**Enlightenment** is the process of improving one's ability to make intelligent decisions in a problem-solving situation, of understanding abstractions, and mastering problem-solving techniques.

**Skill** is the development of potential talents in social, communicative, physical, mental, and aesthetic areas.

**Rectitude** is the degree of concern one has for the welfare of others and the degree of responsibility one has for his ownconduct in association with others.

**Well-being** refers to the mental and physical health of the individual, and to his attitude toward fitness and ability to participate effectively in physical activities.

**Affection** is liking others, being liked, and feeling love and friendship for persons in primary and secondary relationships. In this context, primary relationships are those involving one another, secondary relationships are those between an individual and an institution or group.

The formulation of defensible positions in STS issues, however, involves two other considerations besides values; questions of definition and questions of fact. That is, a good decision also has clear and defensible definitions and factual claims that can be supported. Thus, in the process of clarifying and refining ones position on an STS issue three types of questions are encountered that require resolution if discussion is to be productive. Questions of **fact** ask whether something is true or false, accurate or inaccurate. A question of **definition** asks how key terms are used and what the mean. Questions of **value** asks whether certain actions, objects or persons are good or bad, right or wrong. In the activity presented below see if you can distinguish between questions of fact, definition, and value.

**FACT, DEFINITION, VALUE EXERCISE**
**"ACID RAIN"**

Below are nine questions that might be raised in the course of discussion about acid rain. Label each statement as either a question of definition (D), value (V), or fact (F).

1. Just how much forest is destroyed anyway? _____

2. Is it right that workers in some industries lose their jobs just to save a few trees? _____

3. What's a scrubber? _____

4. Should the states affected by acid rain pay for scrubbers in the states where the problem originates? _____

5. Don't the sources of acid rain contribute far more to the U.S. economy than acid rain destroys? _____

6. How does acid rain affect trout fishing? _____

7. Why doesn't the U.S. government just close down all sources of acid rain? _____

8. Does the federal government have the power to close down all source of acid rain? _____

9. Should the owner of a sulfur emitting plant purchase an expensive scrubber if it means he has to lower employee salaries to maintain profitability? _____

Like value claims, definitional claims and factual claims also must be defended. Definitional claims are typically defended by stipulation -- getting everyone to agree that the term will mean such and such, or by the use of a respected source. The respected source may be the dictionary, but also may be some prominent individual or organization that is held in high esteem. Factual claims are usually defended by either reference to common knowledge -- public knowledge about which there is general agreement -- or reference to some respected source, for example, the findings of a prominent scientist or of some professional organization. In the above Fact, Definition, Value exercise Question 2 involved a value issue, Question 3, a definitional issue and Question 8 a factual issue. How might a student's response to these questions be warranted?

In Appendix A you will find an exercise to sharpen your skills at stating issues and identifying value and fact claims in the issue. Turn to this exercise at this time.

## GETTING STARTED

Most teachers recognize that in their preservice and inservice training they have received little or no preparation in leading discussions. Couple this with the potential free-for-all that discussions may become and it is little wonder that lecture and the textbook are the dominant instructional technique in science and social studies education today. Below are presented some suggestions that hopefully will make classroom discussions worthwhile as well as a pleasant and enjoyable experience.

### Selecting the issue

Teachers should select issues that are relevant to students and that arouse student interest. Such issues may come from course content, current events or the experiences and interests of students. The issue selected should be one on which some sort of knowledge base exists or can be provided, for example, of handouts, reading assignments, etc. Issues should spark discussion and elicit a variety of opposing views. Issues about which students care little, or all have the same opinion or no opinion at all do not generally provide a good context for discussion. Finally issues should be manageable ones given the student's time and ability. Some issues simply may be too complex for a given group of students. Students should be able to feel some sense of satisfaction at the end of the consideration of an issue. They should not feel frustrated or confused. Issues where there exist complex factual disputes are generally not good ones to use.

### Managing the discussion: The Eight Steps

One effective way to organize the class discussion of STS issues is to follow a eight step lesson format. The eight steps are:

1) Introduce topic and provide background material
2) After students have had opportunity to read material review key information
3) Ask students to state the issue
4) Have students write their positions and reasons
5) Have students is groups of three or four, compare responses and try to reach agreement on a common position
6) Have each group express their position and reasons
7) Discuss the different positions and clarify underlying questions of fact, definition, and value
8) Summarize discussion: post positions, note agreement and disagreement, and list any additional information that may be needed

One of the most important steps in any discussion is getting a good clear consensus on the nature of the issue. Most STS issues involve more than one simple issue; usually multiple issues are at stake. For example, in the land use activity (Appendix A) one policy issue deals with the relationship of loan forgiveness to deforestation of Brazilian rain forests. An additional issue might be: Should the U.S. bring economic pressure on Brazil, through a U.S. boycott of Brazilian products, to get the government to stop the deforestation? Clearly for a discussion to be productive only one issue should be discussed at a time. In the initial discussion of the problem the teacher should list all issues raised by students and have the class agree to the discussion of one specific issue at a time.

One mistake many teachers make in class discussions is starting discussion too soon before everyone has had a chance to think about and formulate a position. A good way to avoid this is to give the class five minutes to think about the issue and write down their initial position. This has a number of advantages. At the end of the five minute period all students, not just the most verbose and confident will have an opinion and can be safely called on to relay it without embarrassment.

Once students have their original tentative position with supporting reasons formulated, break the class down into groups of three to four students. In these small groups give 10-15 minutes for group members to compare their positions and reasons and try to reach agreement. Instruct them that at the end of the 10-15 minute period they will report out to the class as a whole the results of their deliberation.

At the time that the small groups report out the teacher should begin to post on the blackboard or overhead, the positions reached and the reasons behind the positions. This typically can take the form of a simple chart:

Position

| Reasons for | Reasons Against |
|---|---|
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |

At this point the teacher and class as a whole begin to examine the different positions and the underlying value, fact, and definitional claims. Finally, the teacher and class will summarize points of agreement and disagreement and areas where further information may be needed.

A summary list of guidelines for handling class discussion is presented below:

1) Use cases with clear value conflicts
2) Make sure the facts are clear
3) Make sure the students see the value conflict
4) Distinguish positions from reasons
5) Focus attention on the values, facts, and definitions
6) Avoid lengthy factual prediction disputes
7) Have students confront each other's reasons
8) Raise alternative perspectives
9) Employ clarifying responses
10) Use analogies embodying the original value conflict
11) Head off cop-outs (attempts to avoid the issue or change focus of discussion)

Throughout the discussion the teacher should emphasize collective decision making -- "What are we going to decide?" "What information do we need?" This will reduce student attempts to "win" the discussion and result in a more cooperative and productive classroom environment.

A list of types of questions that are useful in issue discussions is presented below.

## A TYPOLOGY OF QUESTIONS USEFUL IN ISSUE DISCUSSIONS

Good discussion leaders adapt quickly to the special demands of issue discussions. In the course of the school day, teachers often use the first three types of questions described below -- perception-checking question, interstudent-participation questions, and clarifying questions. The remaining four types of questions may not be so familiar to teachers. They are designed for discussion of reasoning which focus as value questions. The seven types of questions are:

1. **Perception-checking questions** determine whether or not other students understand a statement that an individual has made: "Mary, will you tell me in your own words what Charles said?"

2. **Interstudent-participation questions** ask one student to respond to the position of another student: "Mary, what do you think of what Charles said?"

3. **Clarifying questions** ask students to make the meaning of their own statements clear: "What do you mean by justice?"

4. **Value-related questions** focus attention on one or more moral/value issues: "Are jobs more important than trees?"

5. **Role-switch questions** ask a student to look at a situation from the point of view of another person in the situation: "Jill wants all animal experimentation to end. Would the parents of a sick child want it to stop if it potentially could lead to a cure for their child?"

6. **Universal-consequences questions** ask a student to image what would happen if everyone behaved a certain way: "What would our lives be like if all animals were given the rights of man?"

7. **Seeking reason questions** ask for the reasoning behind the statement of a position: "Why?"

Preparing for discussions is not easy given the unpredictable nature of a classroom of adolescents. It is very common for baffling twists and turns to take place in the course of class dialogue. A common experience is for the teacher, after the class has left, to suddenly realize that he/she should have responded differently: "Gee I wish I'd thought of that then." This is typical; however, one does get better over time. At first it may feel awkward, but as you gain experience your ability to lead classroom discussion will improve. Teachers, in planning for a lesson, should attempt to anticipate the range of student responses to the issue so that they can respond accordingly. It is important also that the teacher take notes as the discussion proceeds so that in the future he/she better anticipate the course of dialogue. Below you will find an exercise designed to give you practice in planning a STS issue discussion.

**Exercise**
**Planning for a Class Discussion**

Given the following class handout on Genetic Screening:

1) List what you would anticipate to be the issues your class would see as important for discussion.

2) What factual claims would be relevant?

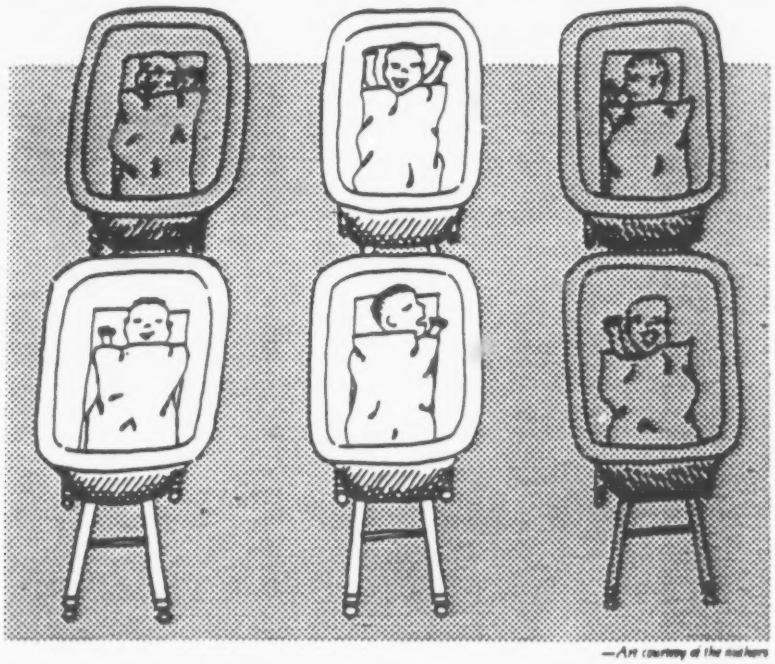
3) What value claims would be relevant?

4) What definitional claims would be relevant?

5) Write five questions that you would use tc move the discussion along.

6) Finally, prepare a summary table of positions on issues with reasons that you think might result from a class discussion.

# Should We Genetically Screen Newborns?



—Art courtesy of the authors

The genes on our chromosomes play a major role in making us the way we are. *Genetic screening* is the testing of people for particular genes, especially those genes that may cause diseases. More than 3000 human disorders involve genetic factors.

Screening can be carried out at any time in the life cycle. People might be screened before birth, immediately after birth, in school, before marriage, or even before employment. In a few years, scientists expect to be able to provide people with total gene screens, complete printouts of their approximately 100 000 genes.

The newborns in the maternity nursery shown above were genetically screened by blood and chromosome tests. Today's test found three potentially serious health problems.

Baby #1: This infant has an underactive thyroid gland (hypothyroidism). Replacement hormone treatment will prevent her from becoming seriously retarded.

Baby #2: This girl is heterozygous for sickle-cell anemia; that is, she is a carrier. If she later has a child with a man who is also a carrier of this genetic condition, there is a 25 percent chance that the child will suffer from the deadly disease.

Baby #3: This boy has a sex-linked chromosomal defect, known as fragile X, that can cause mental retardation and other symptoms. Doctors are treating fragile-X syndrome children successfully with experimental drugs.

Imagine one of the babies with health problems is yours. What would your reaction be to the results of the screening?

## Questions to consider

1. Do you think genetic screening of newborns should be mandatory or voluntary?

2. Whether screening is mandatory or voluntary, who should have access to information about a person's genetic makeup? The tested individual? Parents? Doctors? Schools? Governments? Insurance companies? Employers?

3. Should the state require that children who test positive for hereditary diseases undergo treatment to correct genetic defects?

4. Suppose you were screened as an infant. The test showed that you had a dominant gene for a fatal disease with delayed onset, such as Huntington's disease. When would you want to know about your condition? Why do you feel this way about personal genetic information?

From Slesnick, I.L. & Paakh, J.S. (1988) Difficult decisions: Genetic screening. Science Teacher, 55(4), p.29

## Evaluating issue discussions

One important question many teachers have about issues discussions is how students are to be evaluated. First, the students can be asked to turn in their provisional positions with reasons. Next, teachers can evaluate student contributions to the class discussion. The problem with this is that some quiet students are intellectually involved but don't participate orally. Finally, either as an assignment, or on a test, students can be asked to state their reasoned position and defend it using the principles developed in the lesson. The teacher may wish to develop criteria for grading these positions that involve clear definitions, accurate facts, defensible values, and the like.

A further form of evaluation can take place by assigning two or three students to evaluate the class discussion as a whole. This can be done using the following form. This activity sensitizes the entire class to the criteria of good issues discussions.

### EVALUATING A DISCUSSION OF AN STS ISSUE

This form is designed to evaluate the quality of a classroom discussion of an STS issue. Using a scale of 1-5, 1 being low and 5 being high, indicate the extent to which each of the following characteristics was evident in the discussion.

| | CRITERION | RATING |
|---|---|---|
| 1. | **Stating the Issue**<br>To what extent was the major issue clearly stated and pursued? | 1 2 3 4 5 |
| 2. | **Clarity of Dialog**<br>To what extent were statements clearly worded and key terms defined. | 1 2 3 4 5 |
| 3. | **Taking a Stand**<br>To what extent were positions state on the main issue and supported with reasons? | 1 2 3 4 5 |
| 4. | **Competing Values**<br>To what extent were values not initially recognized raised for consideration? | 1 2 3 4 5 |
| 5. | **Assuming the Roles of Others**<br>To what extent was the issue analyzed from the viewpoints of various people involved? | 1 2 3 4 5 |
| 6. | **Reasoning** | 1 2 3 4 5 |

To what extent were logical contradictions pointed out or analogies raised to challenge reasons?

7. **Responsiveness** 1 2 3 4 5
To what extent were the statements expressed relevant to the issue and responsive to previous comments?

8. **Closure** 1 2 3 4 5
To what extent were positions on the main issue summarized near the end of the discussion?

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# APPENDIX

## APPENDIX

### Issue Identification Activity

Below are listed U.S. science educators' ranking of science/technology -- related global problems. For each problem:

1. State what you see as the most important policy issue facing U.S. citizens today. A policy issue is a question which requires some sort of public decision (often but not always through legislation), either at the local, state, or national level.

2. What values are most central to the development of position on this issue?

3. What facts (science or social science) are necessary for developing a position on this issue?

Example:

| | |
|---|---|
| Global Problem: | Land use. |
| Policy Issue: | Should the U.S. government forgive bank and government loans to Brazil in order to encourage the Brazilian government to adopt more long term approaches to land use? |
| Values: | General welfare -- maintain biological diversity of rain forest -- reduce carbon dioxide in atmosphere (reduce hot house effect) |
| | Honoring contracts -- a deal is a deal |
| | National security -- forgiving laws would increase national debt and weaken military spending |
| Facts: | What is the extent of, past and future of the loss of biological diversity? |
| | If deforestation continued at present rate, slowed, or stopped what would the differing effects be on carbon dioxide reduction in the atmosphere? |
| | What effect would such a policy have on the Brazilian government and its citizens? |
| | What effect would such a policy have on the U.S. economy? |

Global Problems:

Population Growth

Water Resources

World Hunger and Food Resources

Air Quality and Atmosphere

War Technology

Energy Shortages

Land Use

Human Health and Disease

Hazardous Substances

Extinction of Plants and Animals

Nuclear Reactors

Mineral Resources